ENGINEERING NEWS-RECORD

Stornorrfors: Milestone in rockmoving p. 38

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E B POWER G
UNIVERSITY MICROFILMS
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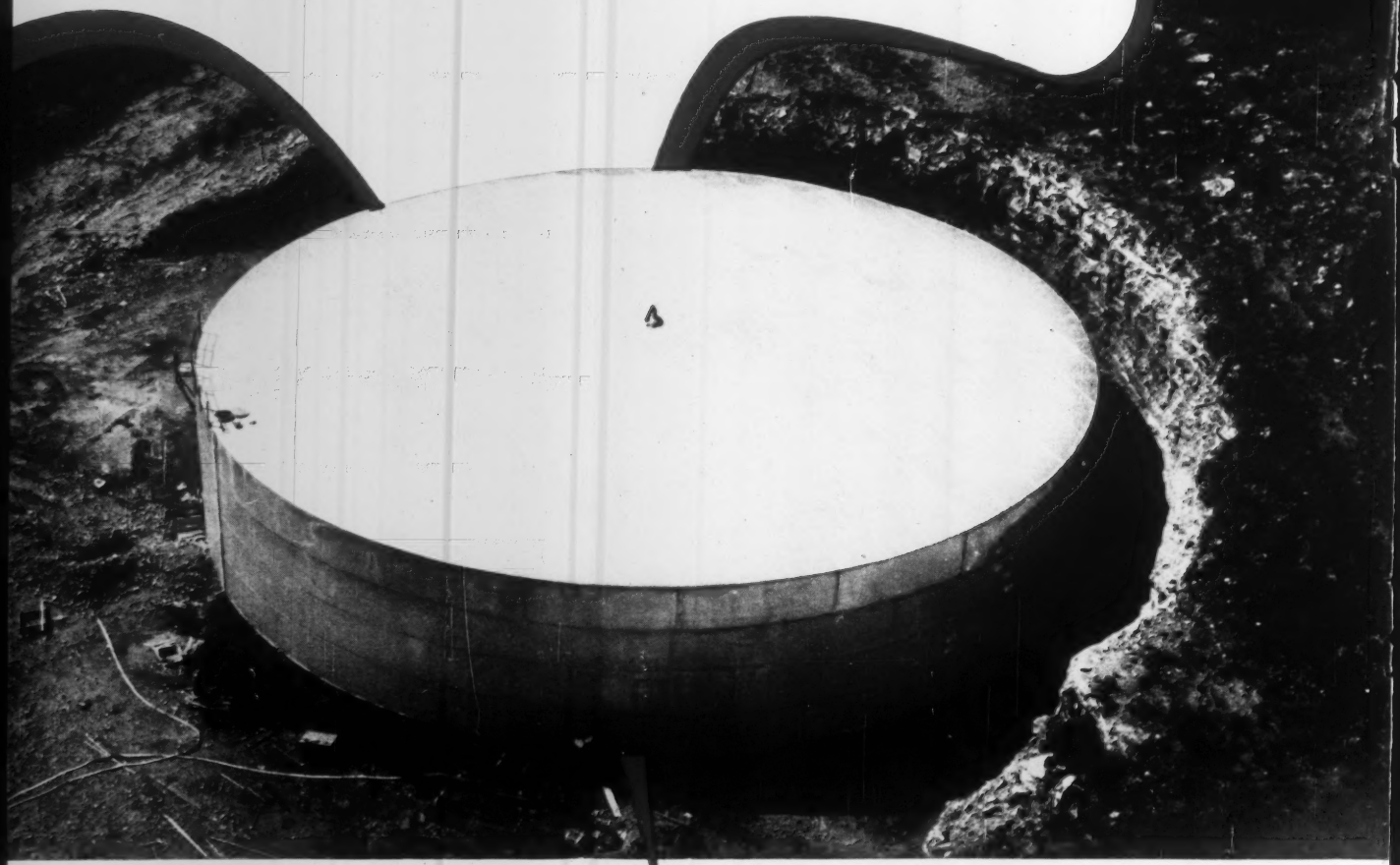
2,333,333-gallon CB&I-Built Aluminum Tank...



stores 83% ammonium nitrate

It's the world's largest all-aluminum tank. 120 ft. in diam. by 26 ft. high and constructed of more than 300,000 lbs. of aluminum, it was fabricated and erected by Chicago Bridge & Iron Company for the Mississippi River Chemical Company at Selma, Missouri. Providing storage for 2⅓ million gallons of 83% ammonium nitrate, it provides Mississippi River Chemical Company uninterrupted storage service with a minimum of maintenance.

Chicago Bridge & Iron Company has complete facilities at four plants to design, fabricate and erect special and standard plate structures of steel or other special metals to meet your most rigid specifications.

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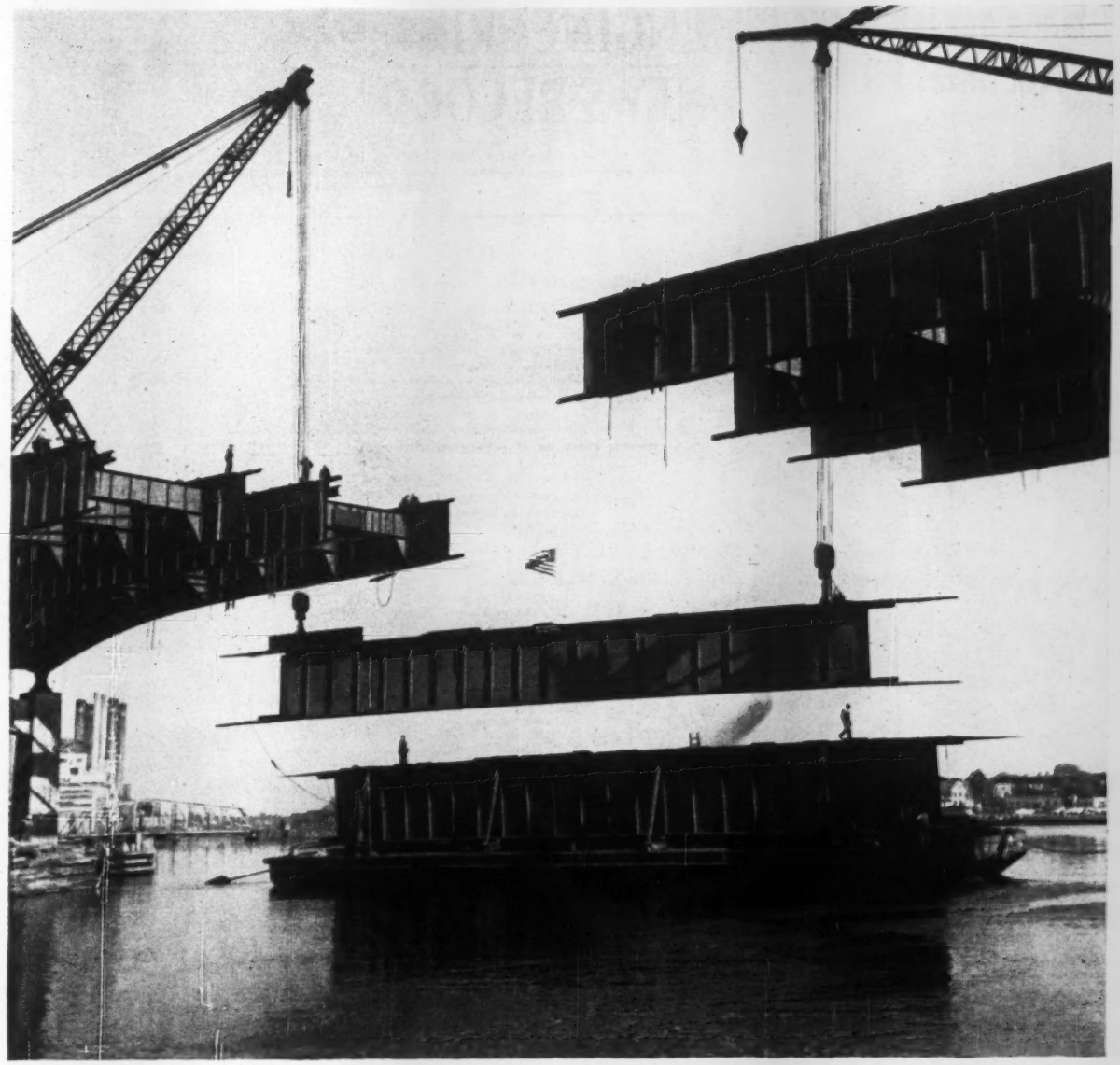

Up it goes!

The scene: New Haven harbor. The occasion: closing what is probably the longest continuous plate-girder span in the United States. The center girders measure 107 ft and the anchor arms 140 ft, for an impressive total length of 387 ft.

The operation shown here was a ticklish job, but it went off without a hitch. Two big travelers hoisted the four 89-ton girders and eased them into place about 65 ft above the channel. This closed the last gap in the 3,769-ft Quinnipiac River Bridge, longest elevated structure on the 192-mi Connecticut Turnpike.

While the bridge also includes beam and simple girder spans, of primary interest is the 906-ft continuous girder section over water. This portion required 3,600 tons of the 11,420 tons of fabricated steel used in the bridge.

The turnpike is a project of the Connecticut Turnpike Commission. D. B. Steinman designed the Quinnipiac River Bridge, and Bethlehem Steel Company was general contractor for the superstructure.

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EIGHTY-FOURTH YEAR OF PUBLICATION

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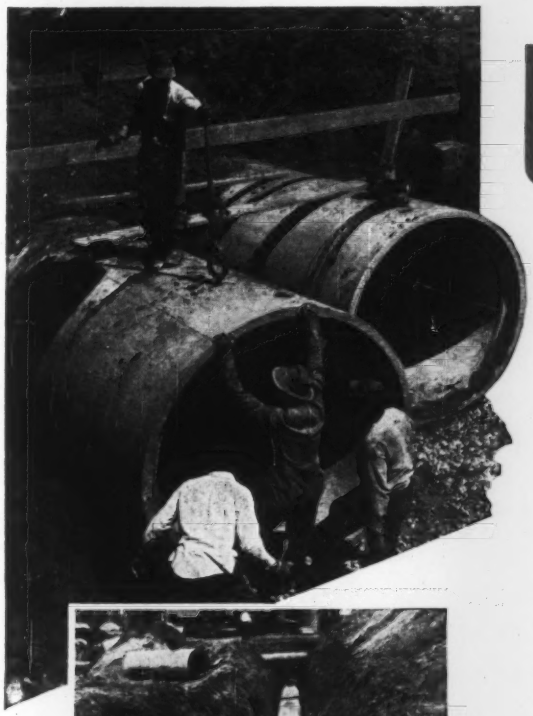

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REPORT

Carbon County's 1½-cu. yd. TerraTrac loads three 5-yd. trucks in 6 minutes — *handles over 1000 cu. yds. of gravel a day,* without tearing up pit floor, as former machines did.

How Carbon County, Montana...increased pit efficiency 30% by replacing two machines with one Case® TerraTrac® "800"

Carbon County, Montana, scenic northeastern gateway to Yellowstone National Park, recently *replaced a bulldozer and expensive dragline* with ONE fast-moving 1½-yd. Case TerraTrac Model 800 tractor-shovel. *Result:* pit production was increased 30%, with greatly reduced investment.

According to *Edgar Gruel,* County Commissioner of Montana District 2, in Joliet, "We liked the price and advanced features of the 80 HP diesel-powered TerraTrac. But, being a new machine, we wondered if it would deliver the goods. Now, after 3 months' operation, we've found it *does more jobs, and does them better than we even expected.* It has already moved 11,000 yds. of material in 150 hours, with no noticeable wear."

"Best machine I've ever operated"

Veteran county operator, *Charles Shandy,* who has spent over 33,000 hours on all types of crawler rigs, adds: "This is the best crawler-loader for its size I've ever run. With torque converter, power steering and instant power-shift, *I can do twice as much work without feeling nearly as tired as I used to* get on clutch-and-shift-type machines."

Carbon County has also discovered that TerraTrac's *exclusive* "counter-rotating" transmission, which permits smooth spin-turns — with both tracks driving in opposite directions — *keeps the floor of their pits in better condition for loading.* Says Shandy, "We've used the TerraTrac in 4 different pits and find that, regardless of floor level, it does not tear up the floor materials, as former machines did."

Handles variety of jobs

Besides speeding gravel-loading, Carbon County's 1½-yd. TerraTrac is kept busy loading *3200 to 3800-lb. rim-rock boulders,* for rip-rapping river banks... digging-out, cleaning and replacing steel culverts... digging cattle crossings ...and handling general road-maintenance work. *"We formerly had to haul out two or three machines to do these jobs — now we handle everything with one TerraTrac '800'," says Commissioner Gruel.*

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Reader Comment

Period Placed Too Soon

SIR—In my letter published in ENR Jan. 9 p. 12, you omitted part of a sentence, with the result that meaning is completely altered, and unless a correction is made I should quite properly be taken to task by many readers. What I wrote was this:

"But by the same token I have never seen a case where a highway department won out, and they have fortunately in the majority of cases, that the results did not meet overwhelming public approval."

You ended the sentence with the word "out."

E. D. SLOAN
President Sloan Construction Co., Inc.
Greenville, S. C.

Cincinnati Garage

SIR—The News Brief, "New Cincinnati Garage" (ENR Jan. 9, p. 27), contains a misleading reference to occupancy of the new Fourth Street Municipal Parking Garage which was opened for partial occupancy on December 2.

The actual facts are that the building was not ready for occupancy on December 2, but was opened for partial occupancy at that time by a working agreement with the general contractor so that the limited amount of space available could be devoted to satisfying the tremendous demand for parking existing during the Christmas shopping season. Most of the building was not available because of construction still going on in the building and this construction work will not be completed until the end of January.

Notwithstanding difficulties of using a building under construction, busy shopping days saw occupancy of this building by several hundred parkers during the Christmas shopping season and at the present time, still under construction, the building has approximately 25% occupancy. There is every indication that it will go to normal occupancy, which is usually about 90% of total

Engineering News-Record welcomes expression of opinions from its readers. Comment should be as brief as possible and pertinent to subjects of current construction importance. Letters should be addressed Editor, Engineering News-Record, 330 W. 42nd St., New York 36, N. Y.

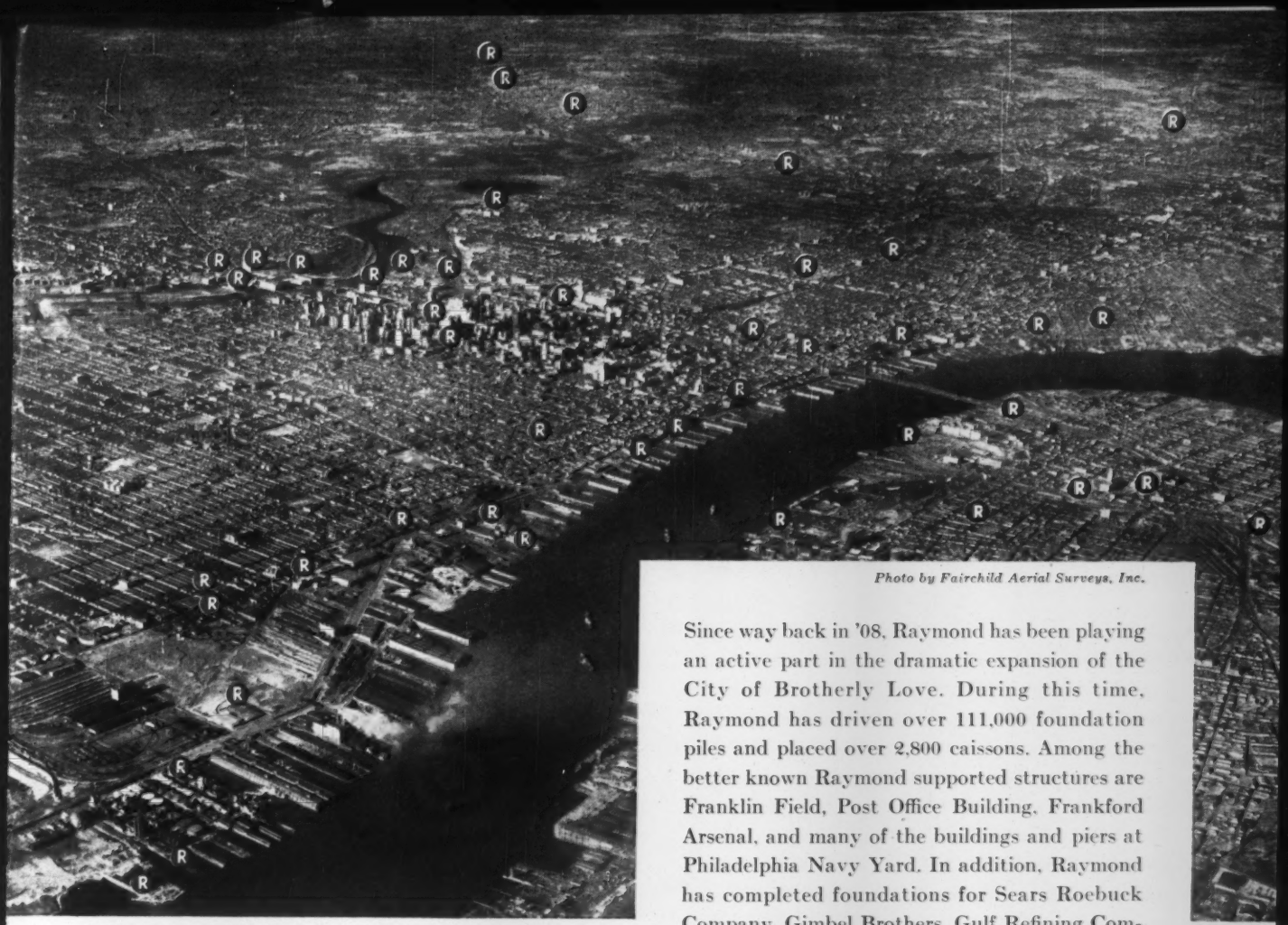

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Photo by Fairchild Aerial Surveys, Inc.

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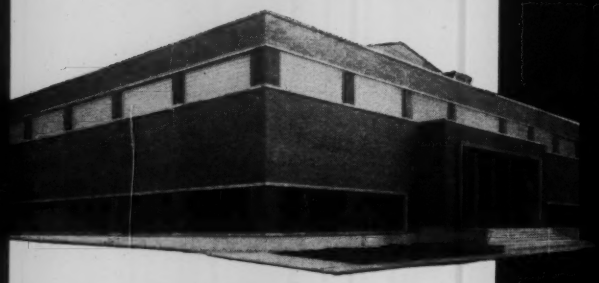
A BIG, BRIGHT GYMNASIUM



BLUFFTON HIGH SCHOOL GYMNASIUM

Architect: A. M. Strauss, Incorporated, Fort Wayne, Ind.

General Contractor: W. A. Sheets & Sons, Fort Wayne, Ind.

Structural Steel Fabricator: Art Iron & Wire Works, Inc., Toledo, Ohio.

Clear-span construction with USS STRUCTURAL STEEL keeps costs down

The vast, postless interior of Bluffton High School Gymnasium at Bluffton, Indiana, gives every spectator a clear, unobstructed view of the playing area. The rigid frame steel construction offers strength, safety, economy of erection, and minimum maintenance—four considerations which are mandatory in present-day school building. Notice the ample amount of window area made possible by rigid frame construction.

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No other common structural material is as *strong* as steel, as *practical* as steel, as *safe* as steel. But architects and engineers need no convincing. They specify structural steel every day for more and more schools, churches, and similar medium-sized structures—as well as for huge skyscrapers, bridges, and aircraft hangars. The versatility of structural steel is not limited by the size of the building. Look at some of these specific advantages of structural steel:

- It is the *strongest*, yet *most economical* of load-bearing materials.
- Structural steel will withstand more abuse than other structural materials, effectively resisting tension, torsion, compression and shear.
- Once enclosed in buildings, it requires no maintenance—lasts indefinitely.
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FOR BLUFFTON HIGH

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2. **HIGH FLOW CAPACITY...**
   Cement lined cast iron pipe and fittings will not tuberculate . . . delivers a full flow for the life of the pipe.

3. **LONG LIFE...**
   42 North American cities are still using cast iron water mains laid 100 years and more ago. Hundreds more have passed the 50 year mark.

4. **BEAM STRENGTH...**
   Cast Iron Pipe is inherently tough . . . stands up under heavy traffic load, soil displacement and disturbance.

5. **CORROSION RESISTANCE...**
   Cast Iron Pipe effectively resists corrosion . . . vital factor in its long life and dependability.

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capacity, shortly after construction work is completed.

Your correspondent also grossly exaggerated remodeling costs. The entire cost of the project will not exceed $1.7 million.

Since your reference is totally inaccurate and reflects upon the professional judgment of the architects and engineers who developed this project as a part of the $17 million revenue bond program of the City of Cincinnati, it would seem appropriate that a correction be made in your reference to this project.

GEORGE W. HOWIE
Director, Dept. of Public Utilities
Cincinnati, Ohio

It's Vial, Not Dial

SIR—We have taken note of the fact that an article on our improved EAGLE transit appeared in ENR December 5, 1957, p. 85. This instrument has a reversion telescope VIAL, not a dial as your article reported.

Also, this is not a new transit, but is the same as the older one we have been selling for over three years, except that it has a stadia arc, reversion telescope vial, and ribbed horizontal plate.

EUGENE MILLER
Vice-President
Texas-Asiatic Import Co.
Dallas, Texas

CALENDAR

Associated Equipment Distributors, annual meeting, Conrad Hilton Hotel, Chicago, Ill., Jan. 26-30.

National Conference on Construction Operations, 3rd annual meeting, University of California, Los Angeles, Jan. 31-Feb. 1.

Associated General Contractors, 39th annual meeting, Dallas, Tex., Feb. 10-13.

National Society of Professional Engineers, spring meeting, Michigan State University, East Lansing, Mich., Feb. 13-15, 1958.

Association of Asphalt Paving Technologists, Sheraton-Mt. Royal Hotel, Montreal, Canada, Feb. 17-19.

National Council for Stream Improvement (of the pulp, paper and paperboard industries), annual meeting, the Waldorf-Astoria, New York, N. Y., Feb. 17-20.

American Concrete Institute, annual convention, Morrison Hotel, Chicago, Ill., Feb. 24-27.

American Society of Civil Engineers, Chicago convention, Hotel Sherman, Chicago, Ill., Feb. 24-28.

Building Research Institute, Plastics Study Group meeting, University of Houston, Houston, Tex., Mar. 5-6.

American Concrete Pipe Association, 50th annual convention, Roosevelt Hotel, New Orleans, La., Mar. 9-13.

American Railway Engineering Association, annual meeting, Sherman Hotel, Chicago, Ill., March 11-13.

New Jersey Sewage and Industrial Wastes Association, 43rd annual meeting, Traymore Hotel, Atlantic City, N. J., Mar. 12-14.

Weldynamics

ARC WELDING AT WORK CUTTING COSTS

Abrasoweld cuts maintenance costs 33% on dragline buckets

Use of dragline demands resistance to both abrasion and impact. The Weldynamic analysis of the job shows Abrasoweld for building up bucket teeth and lips to be the electrode which gives the most economical overall maintenance for 4 out of 5 dragline operations. Used on buckets operating in rocky soil, Abrasoweld wears 3 times longer than other surfaces . . . yet costs less in most cases.

Lincoln men, trained in Weldynamics, will help you choose the right hardsurfacing electrode to solve your wear problems. They stand ready to advise on technique and procedures to guarantee hardsurfacing success.

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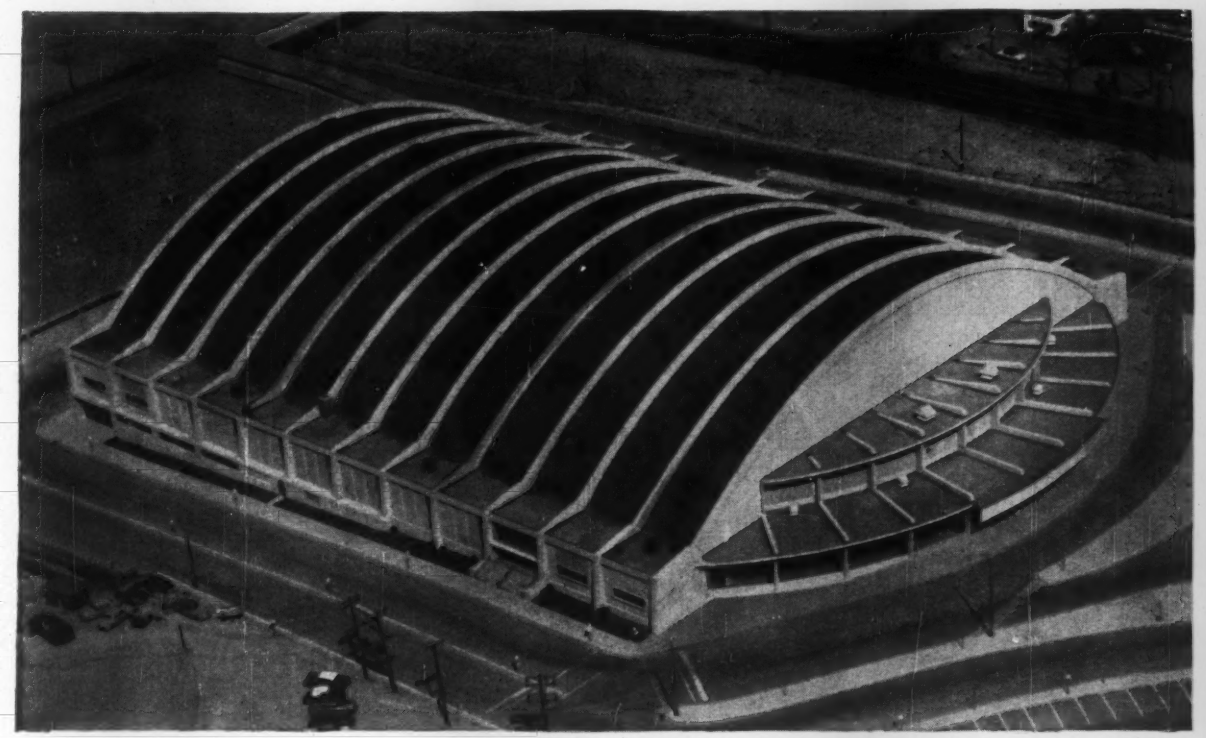

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THE CONSTRUCTION WEEK

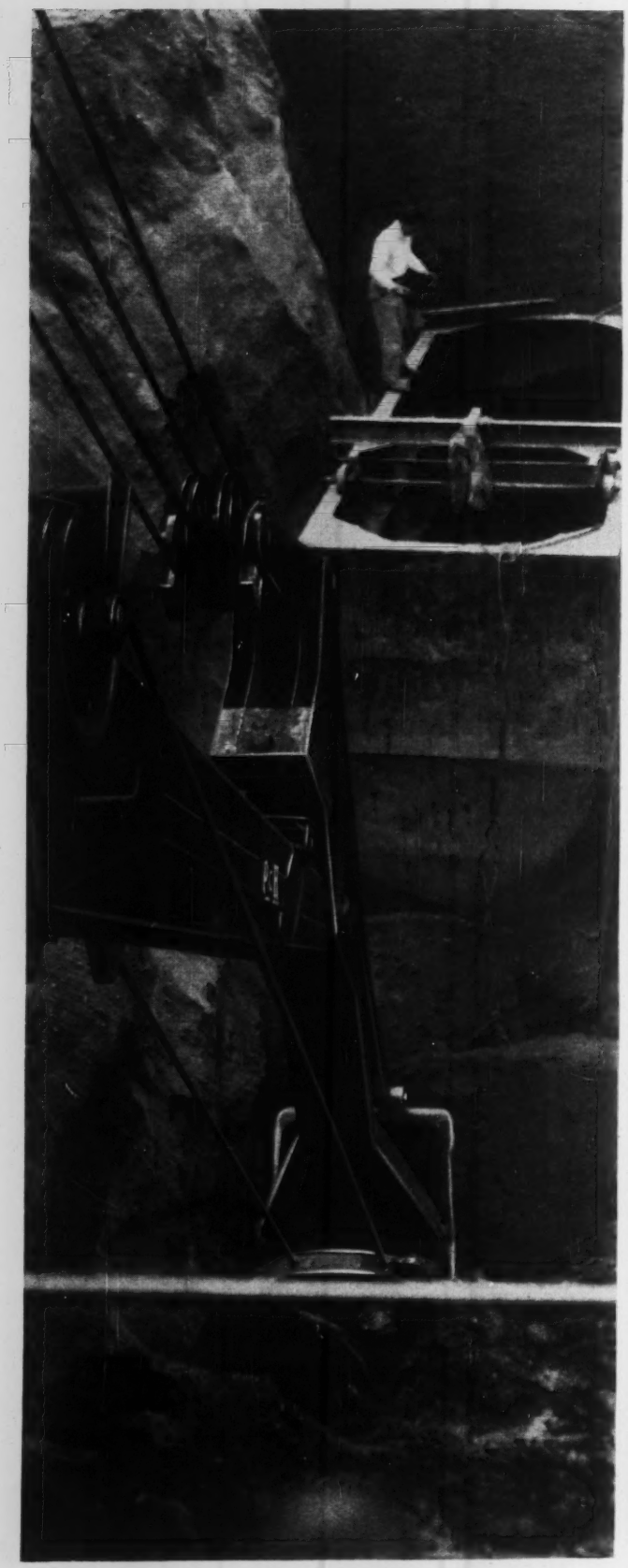
BIGGEST BUILDING JOB?—Eric Johnston, foreign aid advisor to President Eisenhower, last week stated that the biggest building job in the world today is that of constructing and shaping the destinies of those peoples who are wavering between communism and democracy. In a speech delivered to the Building Trades Employers Association of New York City, Mr. Johnston asserted that economic development rather than arms development is the only answer to lasting world peace. At the same time he decried application of the term "give-away" to our foreign aid program. The facts, he says, prove otherwise (see also p. 92).

LONG-AWAITED PRESTRESSING REPORT—The Joint ACI-ASCE Committee on Prestressed Concrete at long last has issued a report on recommended practices for design and construction of prestressed concrete flexural members. Open for discussion, it appears in the Jan., 1958, JOURNAL OF THE STRUCTURAL DIVISION, American Society of Civil Engineers, and the Jan., 1958, JOURNAL OF THE AMERICAN CONCRETE INSTITUTE. This is not a specification; the title, "Tentative Recommendations for Prestressed Concrete."

ALUMINUM DOME THEATERS—Pooling of talents hit a new high with a recent meeting to plan a chain of 15 to 20 new theaters. Present were Henry Kaiser (construction), Frank Lloyd Wright (architecture), Pat Weaver (television), and Mike Todd (movies). The theaters would be of the aluminum dome type already tried by Mr. Kaiser for an auditorium in Hawaii (ENR Feb. 14, 1957, p. 26).

MOLES HONOR TWO—The Moles, heavy constructors organization in New York City, had its award dinner last night and honored two: Peter F. Connolly was the member honored; Francis Donaldson was the non-member—as previously announced (ENR Nov. 7, 1957, p. 27). Speaker of the evening was Bertram D. Tallamy, Federal Highway Administrator, whose big speaking engagement the week before had him before the American Road Builders Association in Washington, D. C. (see p. 21). In Los Angeles the Beavers honored nine (p. 24).

DISTRIBUTORS DISTURBED—This week in Chicago, at the early sessions of the Associated Equipment Distributors' national convention, the general disappointment with last year's equipment sales picture was underlined in two resolutions passed. The first was an appeal to Congress for additional aid—in the form of tax concessions—to small business, i.e., the class into which most distributors and some smaller manufacturers fall. The second resolution was an appeal to government agencies to control their release of used surplus machinery to avoid flooding the equipment market.



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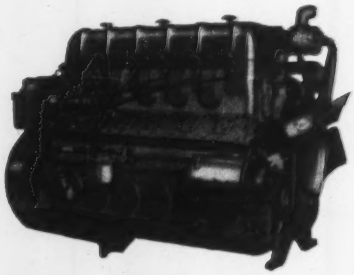

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WASHINGTON OBSERVER

- **Seaway Corp. will run the show**
- **Trinity power control at issue**
- **FHA must move faster**

● **St. Lawrence Seaway operation will be handled by the Seaway Development Corp. unless Congress upsets White House plans.** The President's budget lists funds for the corporation to pay for 110 operating and maintenance employees before the Seaway opens to 14-ft shipping in July; it also calls for building the staff to about 160 for the full 27-ft navigation by April 1959.

Congress may still reverse the Administration decision. Senators and representatives from the Great Lakes states last fall blocked a proposal to transfer supervision of the Seaway Corp. from the Defense Department to Commerce. If Seaway Administrator Lewis G. Castle now wins his fight to operate the waterway with his own staff—instead of engaging the Army Engineers as operating agent as some had proposed—the President would be in a better position to shift the agency to the Commerce Department when and if he desires.

● **A decision on power development of the Trinity River project is nearing.** The House Interior Committee will wind up hearings next week on the issue of whether the federal government or the Pacific Gas & Electric Co. should build and operate the power facilities of the dam.

Testimony of Interior Secretary Seaton will give the key to the outcome. He will be on the stand next Monday or Tuesday.

The Administration generally favors the proposal of PG&E. The utility would build the power facilities at the dam and in turn buy the falling water from the government for generating and distribution of the power. PG&E estimates its cost for building the power facilities will be $56 million.

Rep. Clair Engle, committee chairman, wants federal control over the power. Congressman Engle is expected to be the Democratic candidate for the U. S. Senate from California this year, and expects to make the Trinity project his major issue.

Time for a final decision is nearing. If Secretary Seaton's testimony stands up well, Congress may go along with the partnership proposal.

● **More than just tight credit is the cause of 1957's housing decline.** Washington experts feel that improving the Federal Housing Administration's efficiency, too, might help to stop the downturn in homebuilding.

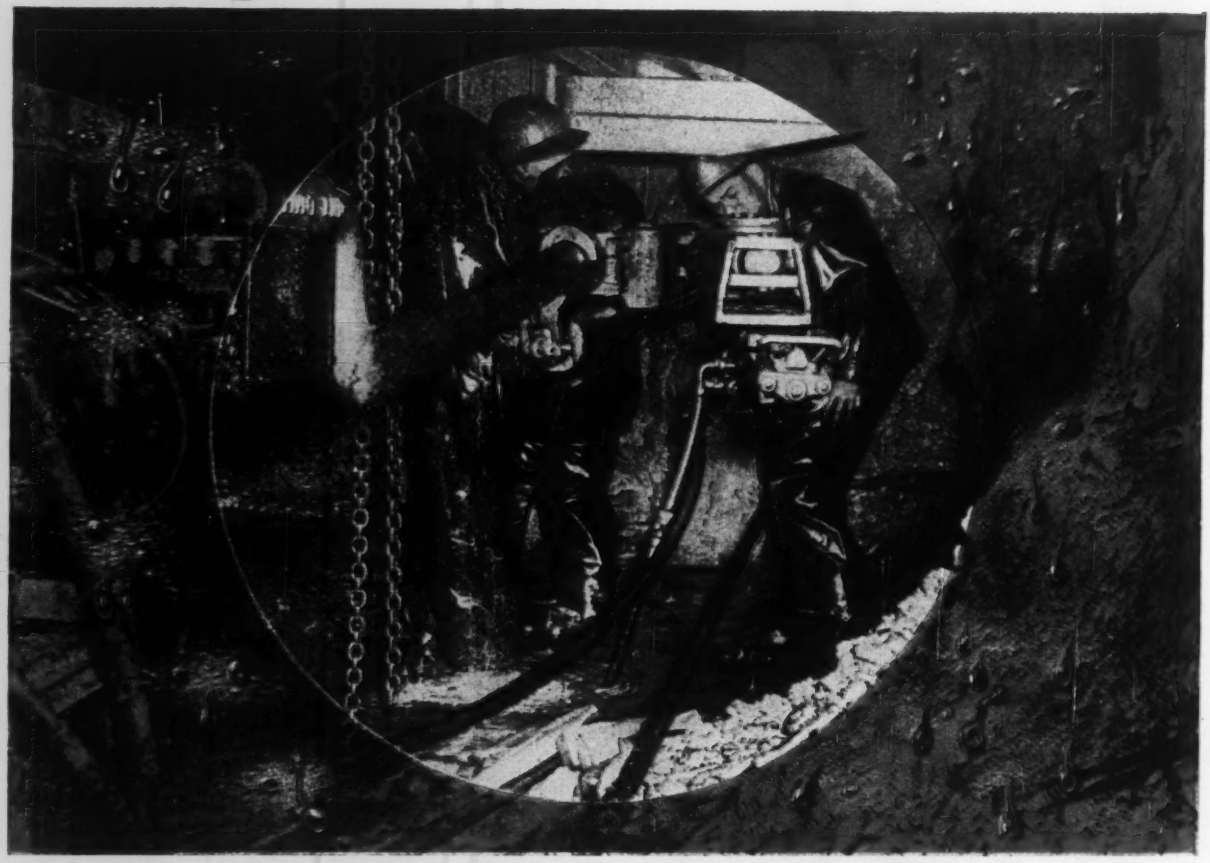
Credit is being liberalized in many ways. The Federal Reserve Board has decreased the discount rate; FHA Commissioner Norman Mason is urging a more liberal assessment of credit risks; closing cost requirements have been loosened. Miles Colean, consulting economist appearing before the Congressional Joint Economic Committee, feels that FHA mortgages will soon be as attractive as other forms of investment.

Vacancies are low. They have declined from 2.7% in late 1955 to 2.4% for the third quarter of 1957.

So, FHA velocity is a major factor in the picture. Economist Colean feels that FHA mortgage approvals must go from last year's 168,000 to 225,000 to guarantee a one-million start year; and they should go to 325,000 to guarantee a 1.1-million start year.

The way is to speed up FHA application processing, which now takes almost a month. He finds that FHA offices are overworked and understaffed. He appeals for simplifying procedures, and ridding staffers of burdensome administrative duties in special programs that do not produce many houses.

US RUBBER AIR HOSE



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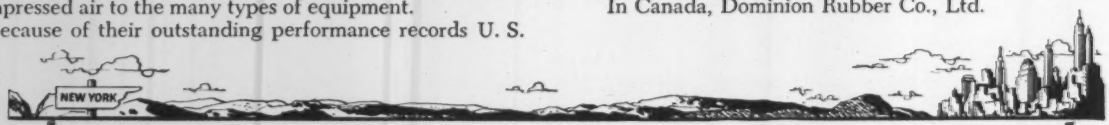

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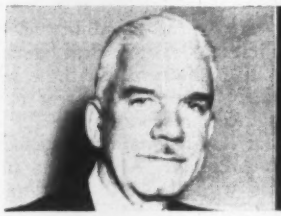
ARBA Meeting at Washington produced . . .

. . . statements by top government officials that may change the picture—so far as time and money are concerned—for U. S. roadbuilders

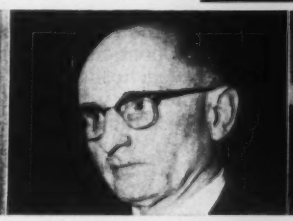


B. D. Tallamy . . .

"Under existing law, program may take 20 years . . ."

Sen. Albert Gore . . .

"We can supply more money, change the law . . ."



Sen. Francis Case . . .

"Keep an open mind about financing methods . . ."

Rep. George Fallon . . .

"Increase appropriations for ABC roads . . ."

More Money for Roads? It's Possible

Concerned lest rising costs of highway construction, under the terms of the 1956 Highway Act, force an endless stretchout of highway construction programs, the U. S. Congress is definitely considering even further appropriations of money to insure that the program is completed on time.

What's more, a powerful group of legislators is pledged to a bitter-end battle against any diversions of money now flowing into the trust fund that fuels the highway program. Even the so-called "Byrd amendment"—which limits highway spending in any year to amounts in the trust fund—could be repealed, said one speaker, if Congress feels it necessary to permit highway construction to move at a faster pace.

Those points—affirmed by Congressional leaders on both sides of the political fence—were the top developments as some 1,600 members of the American Road Builders Association wound up a four-day 56th annual convention in Washington last week.

The implications of the obvious Congressional willingness to speed up the program—hold it within at least a 16 year period—dominated every session, every corridor discussion. Such a change in the federal attitude would, of course, cause a major recasting of both business and legislative plans, as well as increase the pressure on engineering forces.

• **Money to buy time**—The declarations of Congressional attitude were sparked at the opening general session, when Federal Highway Administrator Bertram D. Tallamy matter-of-factly recounted a series of cold facts about the vast highway program.

Said Mr. Tallamy:

Under present law and under proposals for changes so far made public—including dropping some $68 million of aviation tax payments from the highway trust fund—the construction of the planned 41,000 mile interstate system will take 20 years to complete. Biggest reason for the added time is the provision that the trust fund must finance the entire program, but cannot be obligated beyond funds actually in hand.

• **Ready to fight diversions**—Highway Administrator Tallamy's statement got two immediate reactions—both of them sharp, neither of them unwelcome. The roadbuilders themselves reacted with a resolution condemning any diversions of any kind from the trust fund, and hopefully calling on the government to complete the highway program on time.

More violent—and more politically significant—was the reaction of Senator Albert Gore of Tennessee, chairman of the Senate's subcommittee on public roads, who just last Wednesday adjourned lengthy hearings on the progress of the road program. Senator Gore—a candidate for re-election this year—blasted proposals for diversion of payments from the highway trust fund, and other "raids" on the fund by such agencies as the U. S. Department of Labor, which last year got some $250,000 for administration of the Davis-Bacon Act. But his comments on the funding of the highway program itself hit the roadbuilders hard.

"The scope and timing of this program is the most important aspect. If the program isn't finished in the time planned, it may well be obsolete by the time it is finished. Everyone should remember that we don't have to rely on only one source (the trust fund) for money for highway purposes. There is nothing in the law that prevents the Congress from appropriating from the general funds any sums it may deem necessary to keep the program on schedule. If need be, we could repeal the unnecessary Byrd amendment."

(In closing the subcommittee hearings the next day at the Capitol, Senator Gore repeated this assertion, and received qualified support from Senator Cotton of New Hampshire—not a speaker before ARBA sessions—to the effect that Congress must re-examine financing provisions, must not close its mind to need for changes in this regard.)

Still further comment came from

. . . More Money for Roads? It's Possible

Sen. Francis Case of South Dakota, who also devoted some of his talk to rather gently demolishing some critics of the highway program with a recital of facts that indicated his agreement with the claim that the program is on schedule from a national viewpoint.

• **More construction envisioned**—Senator Case pointed out that the program would produce more work for the construction industry than originally had been planned—through added work on interchanges, structures and other details.

The senator also pointed out that one of the reasons for the rising costs of the highway program—now said to be 37% higher than forecast when the act was passed in 1956—is the provision that the new roads must better serve local communities. "This provision alone," commented the senator, "increases the number of grade separations by 63%, and accounts for an increase of about 15% in the total work to be done."

On the subject of financing, Senator Case went along—albeit a bit more mildly than Senator Gore—with the thought of possible added revenues for highways. Said the South Dakotan: "We may need to raise more money if it is desired to complete the program within the 16 years for which the tax levies are presently authorized. We will not close the door to considering ways to increase the funds."

• **More 50-50 funds**—One more top legislator had something to tell the roadbuilders about more money for highway purposes.

Rep. George H. Fallon of Maryland, chairman of the House subcommittee on public roads, said that he is preparing to introduce a bill that would step up the present $875 million yearly appropriation for primary, secondary and urban roads (50-50 matching funds by the states, which also come out of the trust fund) to $900 million yearly for fiscal year 1960, and $925 million for 1961.

Congressman Fallon also registered his opposition to diversion of trust fund money for any purpose.

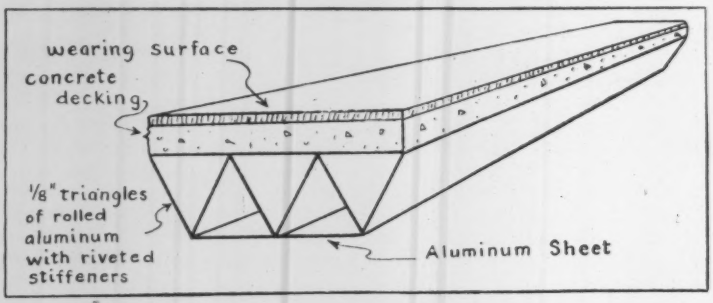
Still on the subject of national highway systems, several other speakers—including Vice President Richard M. Nixon—had words of caution lest some of the state highway departments spend too much on needlessly high-type construction, using up too much federal money for these purposes. Said Mr. Nixon: "The public wants roads, but won't stand for wider frills at the expense of shorter roads."

• **To study consultants' fees**—Among activities at the convention was the formation of a Committee on Professional Engineering Services, which agreed to study the question of engineering fees, and submit its observations to the appropriate committee of the American Society of Civil Engineers. Guy Kelcey of Edwards, Kelcey & Beck of New York, heads this activity.

Other sectional meetings developed the suggestion that it now may be time to investigate the possibility of specifying "results" rather than details, to speed up highway plans; there was also expressed support of five-year curricula for engineering schools.

Julien R. Steelman was re-elected as ARBA president. At sessions in conjunction with the ARBA meeting, the Construction Industry Manufacturers Association elected Boyd S. Oberlink, vice-president of Allis Chalmers Mfg. Co., as new CIMA president. Other officers included: 1st vice president—G. A. Gilbertson, president of the Frank G. Hough Co.; 2nd vice president—Henry Barnhart, vice president of Baldwin-Lima-Hamilton; treasurer—Ray McLean, president, the Jaeger Machine Co.

New Aluminum Bridge Prototype?



One of the more exciting developments flagged in talks at the ARBA meeting revealed a design for an experimental aluminum bridge, to be constructed of rolled sheets according to designs prepared by Fairchild Engine and Aviation Corp. of Hagerstown, Md.

According to H. A. Radzikowski, chief of the Division of Development of the Bureau of Public Roads, the experimental bridge will consist of three beams—which will be three long triangles of ⅛ in. rolled aluminum sheets, stiffened by aluminum extrusions riveted to the sides of the sheets. The three triangles will be connected edge-to-edge at the top to form a top surface, and by an aluminum plate across their points at the bottom. A concrete deck and wearing surface will be placed atop the beams, designed to act integrally with the aluminum structure, in a bridge that is planned for a total span of about 75 ft.

With the aluminum and technical know-how being supplied by a cooperative venture of the nation's three top aluminum producers—Alcoa, Kaiser and Reynolds—the new bridge is expected to be erected some time this year near Bethlehem, Pa., where researchers of Lehigh University will cooperate in testing procedures.

Farley Gannett Dies

Leading engineer stricken at roadbuilders' meeting

Farley Gannett, 77, chairman of the board of the consulting firm of Gannett, Fleming, Corddry & Carpenter, Inc., Harrisburg, Pa., died January 20 in Washington, D.C. Mr. Gannett had arrived in Washington the day before to attend a meeting of the American Road Builders Association.

Mr. Gannett organized his own consulting engineering firm in 1915, after having been chief engineer of the Water Supply Commission of Pennsylvania for 10 years. Specializing at first in the construction supervision of water supply and sanitation projects, he soon was active in hydro power work, later branching out also into the road and bridge field. Large projects in all of these categories were carried out in South America as well.

Today the Gannett firm has a staff of more than 500 people. Mr. Gannett had continued as the active head up to mid-1957 when he effected a reorganization to assure its continuity.

Mr. Gannett, a 1902 graduate of the Massachusetts Institute of Technology, was an early president of the Engineers' Society of Pennsylvania.

NAHB Convention Sees Good Year Ahead

- **Consensus is housing starts will exceed 1 million**
- **But builders are warned against high prices**
- **They swap ideas on cutting construction costs**

Crystal-ball gazing was commonplace at the 14th annual convention-exposition of the National Association of Home Builders in Chicago last week. Economists, bankers, insurance company executives and government officials, as well as builders, took turns commenting on the present state of the economy and predicting the prospects for the homebuilding industry in 1958.

On the whole, the picture is bright. Chances are that mortgage money will be ample for more than one million housing units. Builders are eager to construct that many. Building materials will be available, and land for the projects probably will not be much of a problem. So these speakers said. But the one unanswered question was whether the public would buy these houses.

• **Economic outlook**—Spot checks of the builders attending the convention indicated that the homebuilding industry, in general, was still in mighty good shape. Some builders were pessimistic, but only because they were not selling as many houses as they had hoped they would, though actually their total sales income compared favorably with previous years. Few would admit that sales were off appreciably.

Gordon W. McKinley, director of economic investment research for Prudential Insurance Company of America, told the homebuilders that there would be sufficient demand for housing this year to make possible 1.1 million housing starts. Although he predicted the mortgage market will remain tight in 1958, he believed the net supply of funds to the housing market will rise about $1 billion over 1957, which will be sufficient to finance the expected volume of housing starts.

"Interest rates on mortgage loans will decline very little," he said, "but other terms of the loan will ease more substantially. In particular, I expect a reduction in the average down payment. Since down payments are much more important than interest rates in affecting housing demand, the trend toward lower down payments will exercise a buoyant effect on the housing market."

• **Prices too high?**—Mr. McKinley went on to add a warning to his optimistic analysis:

"The housing industry in recent years has been doing a very effective job of pricing itself out of the market. The price of the average home has risen in the postwar period much faster than has average family income. It does not require an economist to tell you where this trend will lead.

"I recognize that rising land and labor costs must stand a good share of the blame for rising home prices. But builders are also to blame for the very slow improvement in productivity in this industry. And the hard fact is that, no matter who is to blame, a lot of builders are going to find themselves out of business if recent price trends continue. May I therefore urge you to redouble your efforts to get rid of antiquated building techniques and move as far as possible in your own localities toward the lower-cost volume market.

"If the serious upward rush of home prices can be brought to a halt, there is no question in my mind that we can look forward to a minimum of 1.1 million starts a year for many years to come."

A similar warning was given by Sen. John Sparkman of Alabama: ". . . You must keep the customer to the forefront of your planning and avoid pricing yourselves out of the mass market. It should be fairly obvious by now that the 3,000,000 additional units needed to meet our nation's minimum housing needs would not find the customers if they were all built in the $15,000-and-over price class. The need for a good, low-cost house was never greater than right now."

• **Corner turned**—Albert M. Cole, U. S. Housing Administrator, predicted that 1958 would be a better year for homebuilders than 1957—at least 10% better if there were no worsening of the international situation.

"There is reason to believe," he said, "we have turned a corner. Housing production has been rising. Construction costs seem to be stabilizing. There has been no increase in the vacancy rate. Signs point to an easing of the money market as the weeks pass by."

• **Self reliance urged**—W. Franklin Morrison, president, National Savings and Loans League, advised the homebuilders to rely less on federal assistance and more on private enterprise to handle the growing requirements for housing. His opinion was that conventional home financing, free of government control and restriction, is a sure way builders can obtain the mortgage money they need.

He, too, said that housing construction from now on ought to be on the upswing. He expects a supply of mortgage money that will be ample to handle construction of about 1.1 million new dwellings in 1958.

Similar opinions on self reliance were expressed by George C. Johnson, president, the Dime Savings Bank of Brooklyn:

"I believe sincerely that home mortgage lenders should not have to rely on government insurance or guarantees of loans which they themselves are capable of making without such guarantees. The federal housing agencies have pointed the way; the time has now arrived for lenders to stand on their own feet."

Mr. Johnson also said that he favored a mortgage loan with a 30 year term on a conventional basis.

• **Money-saving ideas**—Though the program was heavy on financing, construction techniques were not ignored. Much could be learned in the sessions in which panels of builders described the progress they were making toward offering more house for the money. Here is a sample:

Andy Place, South Bend, Ind., builder, keeps going in all kinds of weather by covering the house site with a large plastic shelter, which is supported only by air from a small blower. He has also found he can save money with a high degree of mechanization.

John Jacobson, Sacramento, Calif., builder, speeds his operations by constructing house components on a conveyor belt.

Ernest G. Fritsche, Columbus, Ohio, builder, minimizes waste by listing his requirements for his lumber supplier and paying only for what he uses, not for the total delivered.

Robert Schleicher, Gary, Ind., builder, cuts the cost of brick walls substantially by cementing ½ in. thick clay or concrete brick directly to sheathing.

In addition, the builders visited nearly 800 exhibits displayed by 300 material and equipment manufacturers.

Nels G. Severin, a San Diego, Calif., builder was elected NAHB president. Carl T. Mitnick of Merchantville, N. J., became first vice president; Martin L. Bartling, Knoxville, Tenn., second vice president; Edward W. Pratt, Royal Oak, Mich., treasurer; and E. J. Burke, Jr., San Antonio, Tex., secretary.

Spokesman Atkinson (left) outgoing president; J. E. Kier succeeds him . . .

Beavers Are Bullish About '58

A prediction that heavy construction volume in 1958 will be as great as in 1957 and a warning that it is contrary to the national interest to use heavy construction for pump-priming the economy were made by Geo. H. Atkinson president of The Beavers, West Coast heavy construction group.

The head of Guy F. Atkinson, Inc., made these remarks at a press conference in Los Angeles in connection with the Third Annual Beavers Award Dinner Jan. 16. At the dinner awards were given to nine construction industry leaders.

Mr. Atkinson, whose remarks were endorsed by incoming Beavers president John E. Kier of Kier Construction Co., based his volume prediction on the expectation that states and cities will this year pick up the slack being dropped by reductions in federal heavy construction expenditures. Highway construction principally will help keep volume up, according to Contractor Atkinson.

The national economy will suffer, Mr. Atkinson predicted from reduced federal water resource and flood control expenditures. He pointed out that the new federal budget has no provision for new starts in this field. And further, he cited that the Bureau of the Budget has stopped bid openings already scheduled, for which money has been appropriated (ENR Jan. 23, p. 22).

Mr. Atkinson said that heavy construction should not be turned on and off like a faucet. It takes a long time to start up a stopped project in this field; and in the meantime suppliers all over the nation suffer from reduced business. He said that the economy would be best served by a continuing even level of heavy construction expenditures.

• **Beavers Awards**—The Beavers Awards are divided into four categories: Management, supervision, engineering and supply.

A management award went to Lester S. Corey who was continuously employed by Utah Construction Co. for 53 years including about 20 years service as president. Among the large dams Corey worked on: Hoover, Bonneville, Grand Coulee and Davis.

A second management award went to J. C. Maguire who heads his own construction firm and who was a leader in organizing the Beavers three years ago. Maguire was in on the construction of Shasta, Bull Shoals, Mt. Morris and Canyon Ferry dams.

In the supervision group an award went to Ralph M. Conner, associated with many construction firms including 15 years with Morrison-Knudsen at the time of his retirement. Conner built Madden Dam in Panama and Imperial Dam in California.

The second supervision award went to A. E. "Jack" Graham. He built the main piers for the Golden Gate Bridge towers and was in charge of salvage at Pearl Harbor. Most of his career was spent with Pacific Bridge Co.

An award in the engineering group went to Harold E. Hedger, chief engineer of the Los Angeles County Flood Control District, outstanding non-federal flood agency. Hedger has been with the district since 1924 except for wartime Corps of Engineer service. He has been chief engineer since 1938.

The other engineering award went to Ross White of Brown and Root, Inc., Texas contractors. In addition to engineering many significant projects, Mr. White has served as project manager on projects such as Marshall Ford Dam.

The awards in the supply category went to Guy C. Kidoo, known as the "contractors' banker" through his work with the First National Bank of Chicago, and to R. G. LeTourneau, famous construction equipment innovator. A special award was given L. N. McClellan, assistant commissioner and chief engineer, Bureau of Reclamation.

Dam Licenses Rejected

FPC turns down low-dam plan on Snake River; favors high-dam Nez Perce

The Federal Power Commission last week refused to license the Pacific Northwest Power Co. for the Mountain Sheep-Pleasant Valley Dams on the middle stretch of the Snake River in Idaho and Oregon.

The action was a bit of a shocker as it overruled the decision of FPC Examiner Edward B. Marsh who had held that Mountain Sheep-Pleasant Valley would best improve and develop the middle Snake. However, the commission ruling did support the recommendation of its staff engineers who held that Nez Perce Dam, just down stream of the proposed duo, was the best development of the middle Snake (ENR March 21, 1956, p. 30).

The Pacific Northwest Power Co., a combine of four private power companies had proposed to spend $144 million for two relatively low, power dams at the Pleasant Valley and Mountain Sheep sites. At ultimate capacity, the tandem would have generated 1.2 million kw.

Nez Perce, according to the latest official estimates which are viewed as conservative, would cost $340 million and yield, ultimately, 2.4 million kw of energy.

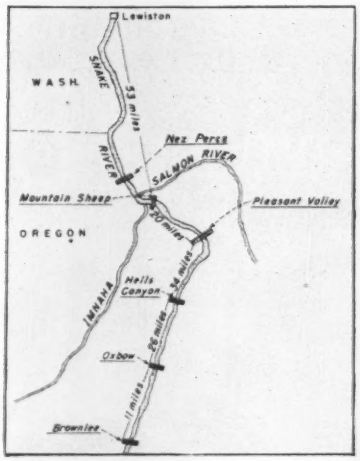
FPC's denial of Northwest Power's licensed application was based on a finding that Nez Perce, "besides being more productive of power, would be more economical and would provide the extras of flood control and other public benefits that Mountain Sheep-Pleasant Valley would not.

• **Reactions**—Pacific Northwest Power Co.'s reaction was one of disappointment and dismay. The company pointed out that it had spent $2.5 million in engineering, drilling, design and hearing costs. Beyond that, it reminded FPC, its customers must have a greatly increased power supply in the early 1960s. ". . . It is not in the public interest to force them to steam power generation," said a company spokesman, ". . . simply because someone thinks a high dam at Nez Perce may some day be built."

Public power partisans, who had strenuously opposed the private development at Mountain Sheep-Pleasant Valley, were pleased, puzzled and—for the moment—without a strategic plan for taking advantage of what seems to be a real victory for them.

FPC shied away from recommending either private or federal development of the middle Snake.

• **Where now?**—In the wake of the de-



TROUBLE SPOT—FPC license action augurs bitter dispute over middle Snake.

cision, the commission's stand is interpreted as an invitation for Pacific Northwest Power to apply for a license to build a higher dam at Nez Perce. But it is also viewed as an invitation for public power partisans in Congress to throw in hasty legislation for a federal high dam at Nez Perce.

Both sides are wary because of the economically and politically important salmon. Nez Perce development would threaten the spawning ground of at least 25% of the salmon and steelhead in the entire Columbia Basin. Fish engineers have satisfactorily solved the problem of getting migratory fish upstream, via ladders, to their spawning grounds, but they have yet to demonstrate that they can satisfactorily engineer the young fingerlings past the turbine blades on the return journey.

Another possible course appeared to be a legislative demand for a "freeze" on middle Snake development until the Corps of Engineers completes its comprehensive "308" re-study of the stream, due near the end of this year.

• **High dam**—Still another alternative, for both private and public interests, is a move for a high dam at Pleasant Valley in lieu of a Nez Perce development. Tentative Bureau of Reclamation studies have put generating capacity, storage, and other benefits at or near those for Nez Perce, and the cost (amounting to about $350 million) is approximately the same.

A high Pleasant Valley Dam would circumvent the salmon problem, but it would raise another. It would flood out the low-dam Hells Canyon and Oxbow sites for which Idaho Power Co. now holds licenses.

In the view of most Washington observers, the Federal Power Commission has now created a situation that will mean delay and bitter long-term battling over the middle Snake.

Solar Energy Highlighted at ASHAE Meeting

Solar energy was a major topic at this week's annual meeting of the American Society of Heating and Air-Conditioning Engineers at Pittsburgh, Pa.

The performance of a solar heated office building in Albuquerque, N. M., which was successfully operated last winter, came under close scrutiny in a report by F. H. Bridgers and D. D. Paxton consulting engineers. The findings indicated that the use of solar energy for heating provides substantial fuel savings—but the high initial cost of furnishing such a system makes it economically unsound for most areas.

"The energy cost for the 4,300 sq ft building last winter was $78.46, where the energy cost for a conventional gas-heating system would have been $168.90," said the authors. The total cost of the building was reported at $58,500 and the mechanical system (including plumbing, heating and air-conditioning) cost $17,400.

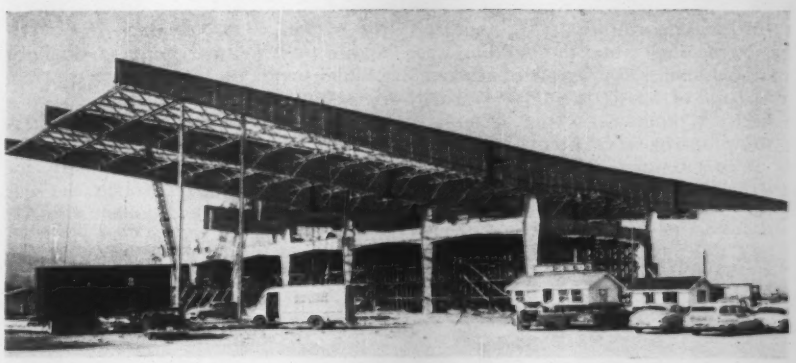
A 6,000 gal insulated underground water storage tank was used in the building to store collected solar heat for cloudy weather and night-time use. A 7½ ton package water chiller was used as a heat pump in winter and for cooling the building in summer. Solar collector plates are supported on a wood framework on the south side of the building. After a few minor initial operating difficulties were corrected, the system performed satisfactorily.

If reductions can be made on the cost of solar heating systems, they may be economically attractive over a large part of the U.S. in a relatively short time, the authors concluded.

Another potential use for the sun's energy was explored in a report on the air-to-air heat pump as a means of year-around air-conditioning. Acceptance of this system has hitherto been limited by its decreased capacity when maximum capacity is required. A means of supplementing the capacity by the use of solar energy was explained by Chester P. Davis Jr., of the Agricultural Research Service, U.S. Department of Agriculture and Ralph I. Lipper, associate professor in the agricultural engineering department, Kansas State College.

A simple, low cost, flat plate collector would capture the sun's energy. This heat is then made available for home heating via the heat pump cycle.

Another report discussed a new means of improving attic insulating values. A highly reflective "breather" sheet that covers the fibrous insulation between ceiling joints can contribute to a substantial reduction in summer cooling load, said F. A. Joy, professor of engineering research, Pennsylvania State University. He described the results of tests on two attics each having 2 in. of fibrous insulation in the ceiling topped by aluminum foil, by reflective paper, and by kraft paper, with a wide range of attic insulation.

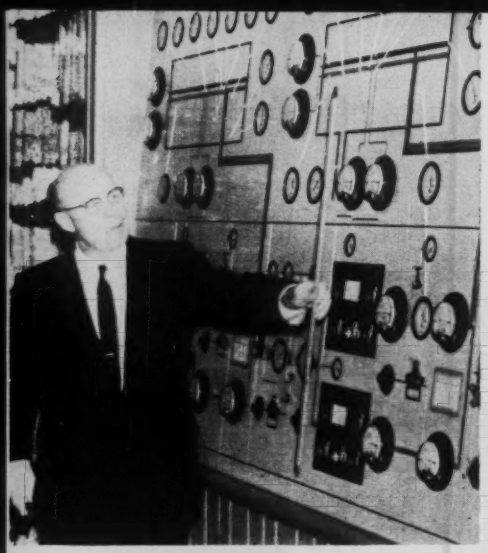


Longest Cantilever Girders Now Erected

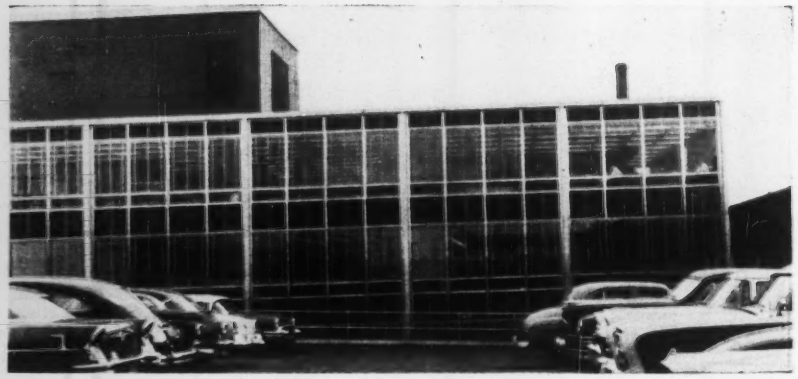
The biggest welded plate girders ever made in this country are now in place in a new United Air Lines hangar under construction near San Francisco International Airport. The huge members cantilever 142 ft each way from a three-story concrete core structure, setting a new record for cantilevered girders.

Seven of the girders, 265 ft long and weighing 125 tons each, support the roof of the structure. When completed next fall, the hangar will provide 153,000 sq ft of floor space for line maintenance of aircraft. It will be able to hold two Douglas DC-7 transports and four Douglas DC-8 jet transports, now on order by the carrier.

Architects for the hangar are Skidmore, Owings & Merrill. Dinwiddie Construction Co. is the general contractor, and Pacific Iron & Steel Corp. fabricated the girders.



INSTRUMENTS monitor air temperatures and pressure over 15,000 sq ft area.



DEMONSTRATOR BUILDING as well as office building, this structure is built largely of floor, roof and wall components manufactured by the owner, the H. H. Robertson Co.

Office Building Assigned Triple Role

A tri-purpose structure unveiled last week in Ambridge, Pa., will serve as a two-story-and-basement office building, a showcase for installed building components and a full-scale test model for a new adaptation of an old product of the owner.

When H. H. Robertson Co., the owner, had to build more office space on the 40 acre grounds of the Ambridge plant, it was natural to use to as great an extent as possible the wall, roof and floor components accounting for most of the firm's $60 million annual sales. A further opportunity lay in the fact that at the time when the building was being planned, several years of research on the use of cellular steel floor—an old Robertson product—for the secondary distribution of conditioned air were about to culminate in the entry of a new version of the product into the market.

Company researchers (including the president, A. W. Coffman, a chemistry PhD who came up via the laboratory route) seized the chance to study in even greater detail the air-conditioning characteristics of their brain child. As a result, the building is elaborately instrumented to enable company engineers to check continuously (and to demonstrate to outsiders when the occasion demands) the performance of the double-duct, high-velocity air-conditioning system.

There is nothing radically new about the system. The openings—made primarily for structural purposes—in both cellular metal and hollow-core concrete slabs have been used before to carry air. But whereas the usual practice is to accept the air-carrying shortcomings of openings dimensioned purely for structural efficiency, Robertson has gone to considerable trouble to find a size suitable for both structural and air-distribution purposes. The result is decking with oversized cells to cut down pressure losses due to friction.

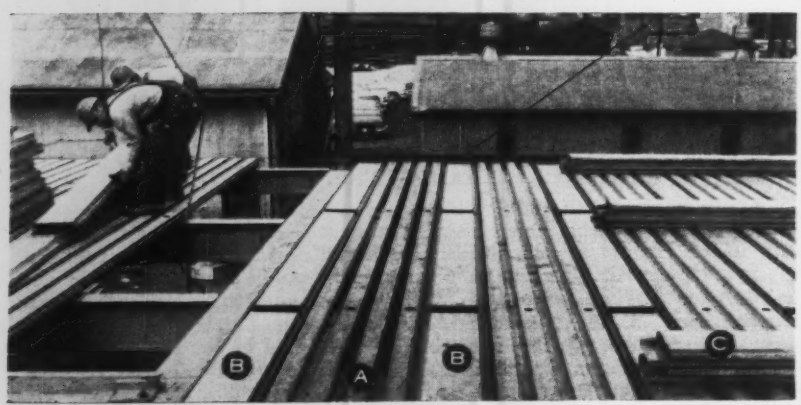
With the big units (3 x 9⅝ in. openings) interspersed among standard cells (3 x 1⅝ in.), the metal decking is spotwelded to the top flanges of the supporting steel beams; butt joints and open ends of the air cells are sealed, and the entire floor structure—including the usual electric and telephone header ducts across the top of the others—is covered with concrete finish. Primary air distribution is made through a conventional system of underfloor ducts. Room outlets are the baseboard type, incorporating mixing boxes.

Heating and cooling equipment, blowers, filters and other operating components of the system—all located in a penthouse—are either separate or separately instrumented for each of the three floors served.

The 50 x 110 ft building itself is treated, in the air-conditioning system, like a large multistory structure. The basement is considered the approximate equivalent of a core space, with no outside walls; the first floor is the model of a typical tower floor, with air-conditioned above and below and weather exposures on the sides, and the second floor is expected to perform like any other top floor, exposed to the weather on the roof as well as on the sides.

Each floor is monitored for temperature in room spaces and ducts at 10 to 13 points and for pressure in the ducts at four to six points.

The building was designed by Oscar F. Wiggins, architect, and William A. Rose Associates, engineers, New York City.



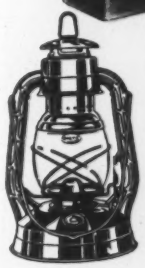
NEW FLOOR SYSTEM of cellular steel construction incorporates (A) conventional cells sized for structural purposes only; (B) oversized cells which also distribute conditioned air, and (C) header ducts serving electric and telephone outlets.

Outshines them all

DIETZ Visi-flash TRADE-MARK HAZARD WARNING LIGHTS

"Brighter . . . tougher . . . low-cost . . . trouble free!" These are but a few of the enthusiastic quotes from contractors, municipal, county and state officials, utility and industrial users in commenting on new transistorized Dietz Visi-Flash Hazard Warning Lights.

- **The transistor circuit makes it shock-proof, uses minimum current, won't wear out . . . eliminates common maintenance problems.**
- **Optical lenses, longer dwell time, and "white" bulb make Visi-flash up to 40% brighter.**
- **First cost is 15% to 25% less than ordinary flashers.**



DIETZ LANTERNS The only complete line of construction warning lanterns. Six different models from which to choose, each designed for a specific job. Send coupon for catalog.

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Four types available. Sturdy, bright, reliable, longer burning. Leaktight, 20 gauge steel construction. Flat-bottom or weighted-bottom styles. Send coupon for catalog.

In actual field tests, made at 800 and 2,000 yards, Dietz Visi-flash proved the brightest, and most visible in all types of weather.

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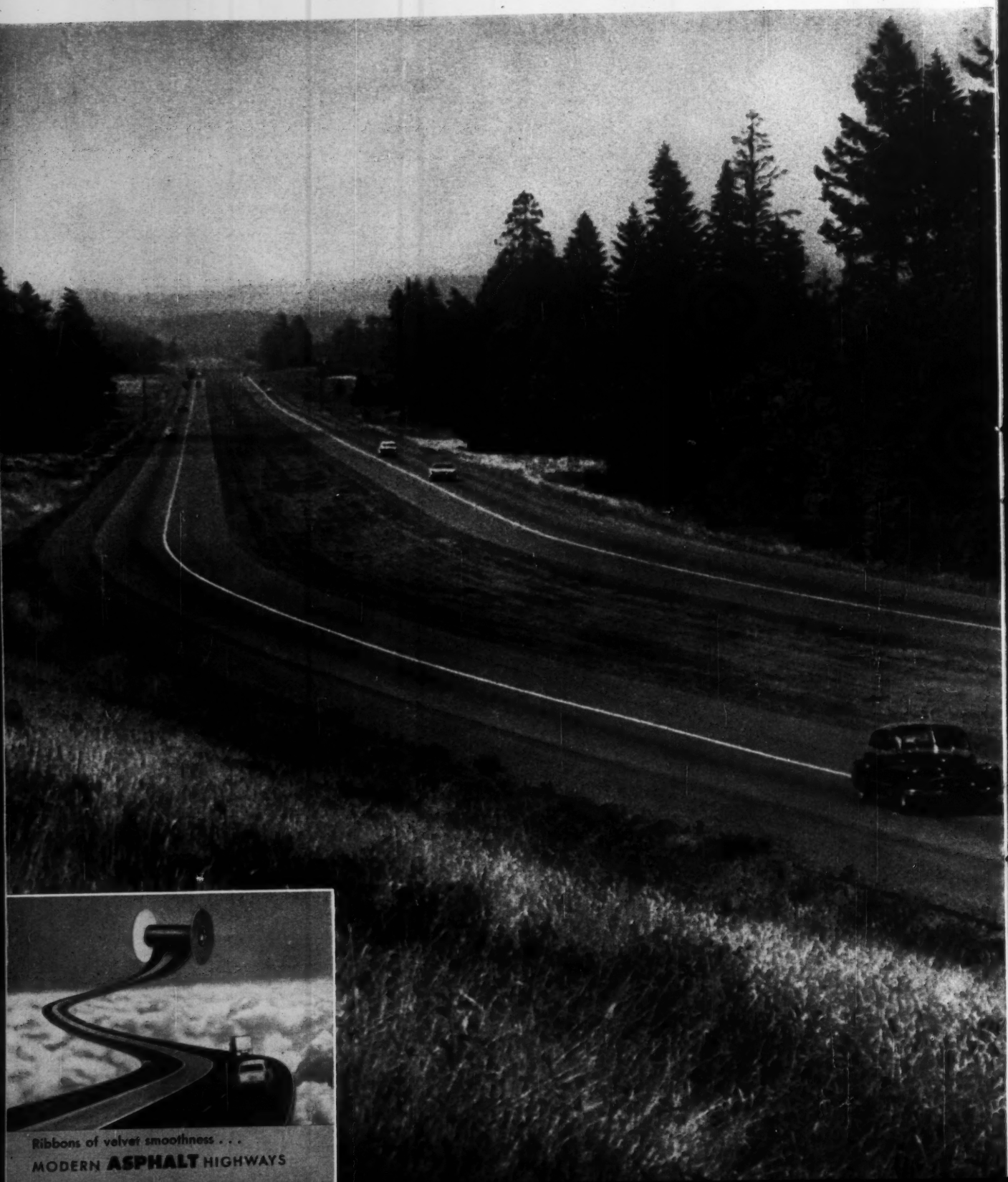
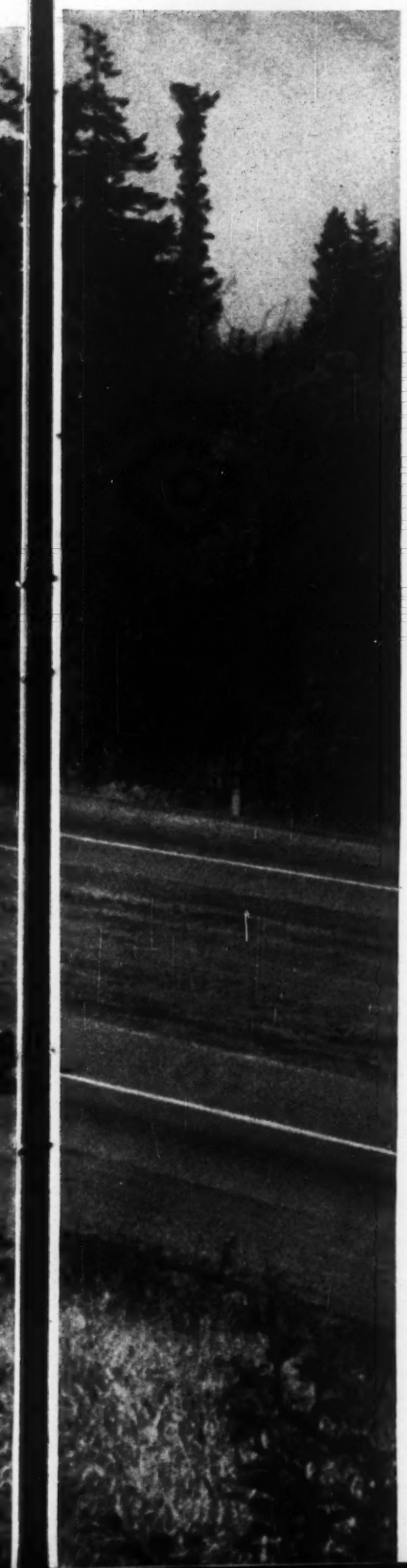
Rugged ASPHALT paving saves



Ribbons of velvet smoothness . . .
MODERN **ASPHALT** HIGHWAYS

Washington $30,000 a mile



...Saves State $381,000 in first cost on 12.7 miles of Interstate Highway. Maintenance savings expected, too!

For the Prairie Creek to Tumwater section of U. S. Highway 99, the State of Washington chose modern Asphalt pavement.

By so doing it saved thousands of dollars in initial costs alone. The entire paving cost for 12.7 miles was $826,978 . . . with savings of $30,000 a mile compared with a connecting slab-paved section. *And more savings are to come . . . for Washington's records indicate that Asphalt pavements cost less to maintain.*

As records show in state after state, modern Asphalt highways are not only economical but also rugged and safe.

Rugged . . . because layer-upon-layer construction "locks" surface to the foundation, builds up strength and resilience.

Safe . . . because modern Asphalt pavement is traction-textured for high skid-resistance. There is less glare . . . greater traffic-line visibility.

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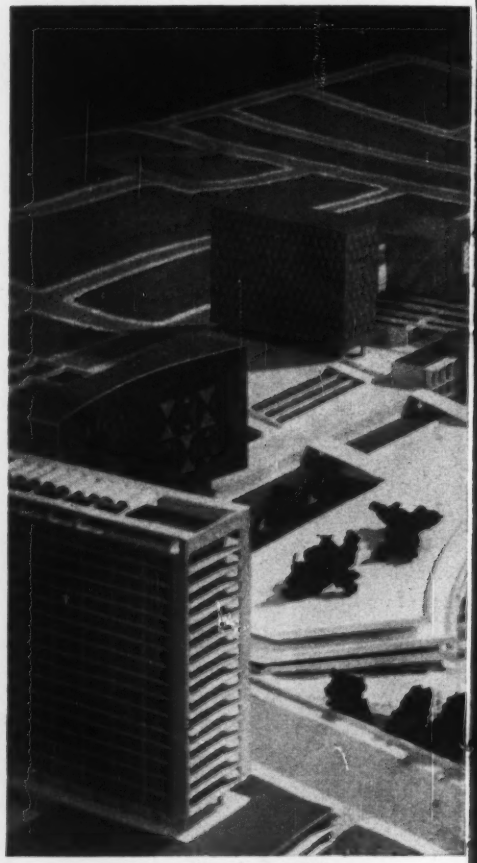
ENGINEERED FOR RUGGED WEAR

Modern Asphalt construction is a triumph of road-building science. Built-up layers spread the load . . . absorb shock and pounding. Economy, safety and comfort are built-in to last.

THE ASPHALT INSTITUTE
Asphalt Institute Building, College Park, Maryland

Open-and-shut dome of Pittsburgh's planned new auditorium will weatherproof outdoor summer theatricals. The pushbutton-operated roof will render the rain check obsolete.



ROLLED BACK, the roof will occupy only a quarter of its extended area.

Auditorium-Stadium Will Have Roll-Back

Pittsburgh and Allegheny County, Pa., are embarked on a plan to beat the weather and have it too—at least for devotees of outdoor summer concerts. The joint city and county Public Auditorium Authority is taking bids next month on a $17-million auditorium with a retractable roof. When the building is completed, concerts and other crowd-drawing events can be held either indoors or outdoors at the push of a button.

Nearly circular in plan, the domed metal roof will be 403 ft across one way, 413 ft the other and 116 ft high at the center. It will be divided radially into eight leaves, slightly differing in size so that they can be nested. Hinged on stationary vertical pins at the crown and mounted on wheels and steel tracks around the base, the leaves will roll into nested position like multiple-leaf rolling doors. All eight can be stacked four deep in the area otherwise occupied by two leaves, thus opening up three-quarters of the dome to the sky.

• **Began with the opera**—The idea of the retractable roof originated with the sponsors of Pittsburgh's Civic Light Opera. They concluded about 10 years ago that the summer season would not succeed financially or artistically as long as they had to use the University of Pittsburgh's football stadium. The acoustics were poor, there was too little off-street parking, the hilltop location discouraged some potential patrons, and —worst of all—the weather was wrecking the box office. Rain washed out many performances, and the mere threat of it kept people away in droves. The solution, everybody agreed, was an outdoor amphitheater with a retractable roof.

By 1954, when the idea had crystallized to the point that the Public Auditorium Authority was organized, the scope of the project had broadened to embrace not only a home for the opera company, but also a setting for athletic events, trade shows, conventions and gatherings of local groups.

• **The big plan**—The building will be constructed on a 20 acre site in a 95.4 acre area designated as the Lower Hill Redevelopment, a Title I slum clearance and redevelopment project of the Urban Redevelopment Authority of Pittsburgh. The auditorium with its grounds and parking lots, plus 10 more acres to be occupied—it is hoped—by such buildings as a playhouse and music hall, will complete a 30 acre cultural center.

About 30 more acres will be given over to streets and a projected highway, Crosstown Boulevard (ENR July 11, 1957, p. 64) which will have an interchange near the auditorium. The remainder of the development will consist of commercial construction and private apartment houses.

• **Part-time stage**—The auditorium will have 9,100 permanent seats, but depending on the event, capacity will be variable. It will be 10,500, for example, for hockey matches; 11,700 for basketball; and a maximum of 13,100 when only a small dais in the arena is required for the activity. For operatic performances, however, capacity will be cut to 7,000, which will be 2,100 less than the permanent seating. This unusual situation arises from the fact that some of the permanent seats will occupy an area covering the stage.

When the 118 x 64 ft stage is needed, it will be exposed by hydrau-

Roof

lically raising the seat section. The bottom of the raised section then will serve as a fireproof proscenium from which curtains and other stage accoutrements can be suspended.

• **Debate preceded accord**—Although created for the purpose of producing an auditorium, the authority was not firmly committed to a retractable roof. In fact, a quiet debate revolved about the subject right from the beginning and threatened to become a first-class fight in 1956 when it was learned from an economic survey that a retractable roof would cost $2¼ million more than a conventional one. Agreement was eventually reached, however, that the extra money would be well spent.

• **Roof construction**—There will be no interior supports for the dome. The leaves will rest on rails laid on a reinforced concrete ring girder, and the pins at the crown will be supported by an exterior steel frame that cantilevers from outside the dome, like a three-legged pylon bent over the curved shell.

The crown of the dome is, in fact, two crowns 10 ft apart. The exterior cantilever frame will terminate at the top in a 10 ft cross member, each end of which will be a multiple clevis and vertical pin for the connection of four dome sections. The distance between the clevises accounts for the 10 ft difference between the long and short diameters of the dome, and amounts to the insertion of a 10 ft separation (in plan) between two semicircular halves. This strip will be roofed by 5 ft extensions of the leaves on either side of it.

Only three of the four leaves attached to each clevis move. The stationary leaf is pinned, nevertheless, for structural reasons. The two stationary leaves, with their 5 ft extensions, meet to form one quarter of the dome, and the exterior cantilever frame curves upward above the joint between them. These two are the smallest and, therefore, the innermost sections when the leaves are nested. The order of size and nesting proceed each way around the dome to the outer, largest leaves on the opposite side.

The framework of the dome sections will be rolled steel shapes, the main ribs being 30 in. wide-flange beams. The outer face of the roof will be cellular metal decking, covered with rigid insulation, felt and either aluminum or stainless steel roofing sheet (both metals to be priced alternatively by bidders). The underside of the framework will be covered with perforated metal ceiling.

Openings between overlapping edges of adjoining leaves will be sealed with nylon-reinforced neoprene. With one edge hung from the underside of the upper leaf along each joint, the material will have a cable threaded through it. When the cable is tensioned, it will tend to straighten out and thereby will press the sealing material—bulb-shaped along the edge—tightly against the lower leaf. Tensioning of the cable will occur automatically as the leaves are rolled into the closed position.

Four of the six rolling leaves of the dome will be mounted on 12 wheels each—five intermediate two-wheel trucks and two single-wheel trucks at the ends. On the other two rolling leaves, with 5 ft extensions, one of the end trucks will be the two-wheel type. Two-wheel trucks will be powered with individual electric motors.

• **Roof supports**—The reinforced concrete ring girder supporting the roof will encircle the building at an elevation about 33 ft above the arena floor, making overall height of the building nearly 150 ft. Width of the girder will be just under 20 ft except in the quarter supporting only the two outermost leaves, where it will be about 16 ft. The upper surface of the girder will be banked like a superelevated roadway, sloping down about 13 deg from horizontal toward the auditorium interior. Supports for the member will be reinforced concrete frames spaced around the perimeter every 7½ deg—about 26 ft apart along the 197½ ft radius semicircles locating the inner legs of the frames.

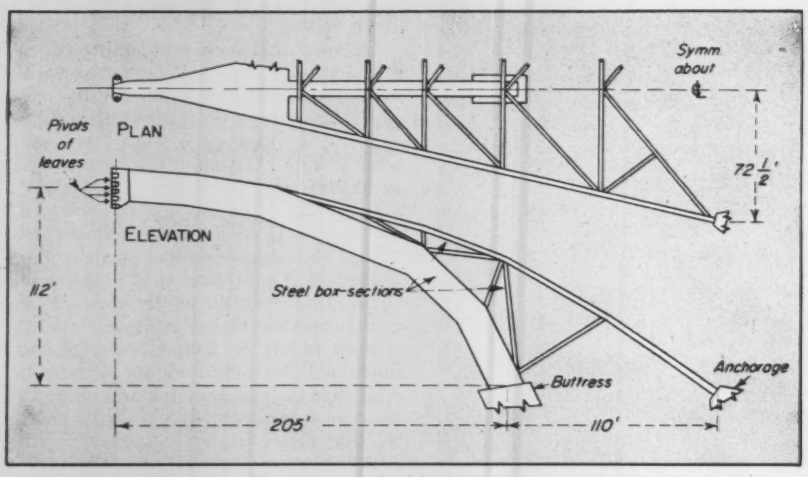
• **Space and facilities**—The lowest level of the auditorium will contain 50,000 sq ft of exhibit space, which can be increased to 85,000 sq ft by opening sliding doors to incorporate the 140 x 250 ft arena. Also on this level will be locker and dressing rooms and space for storage, equipment and maintenance. The street level will contain three meeting rooms.

There will be 32 utility columns containing gas, electric, water and compressed air lines. For exhibitors who might want to use welding equipment, there will be 400 amp electric service.

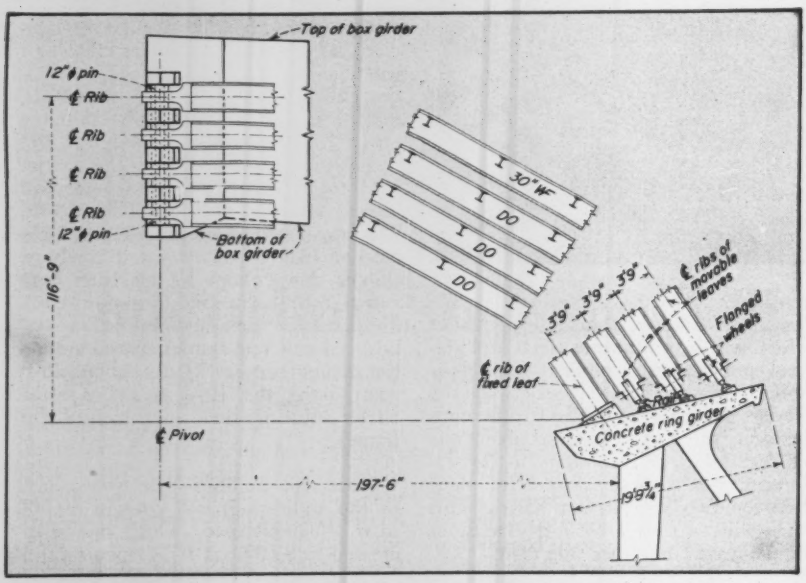
The auditorium will be air-conditioned by two units, one of 800 tons capacity and one of 200 tons.

In hopeful anticipation of large conventions, perhaps a national political convention, the plans include five permanent television camera sites, located in consultation with TV people, and a TV monitoring room equipped with outlets and other facilities used in transmission, including bulky color TV

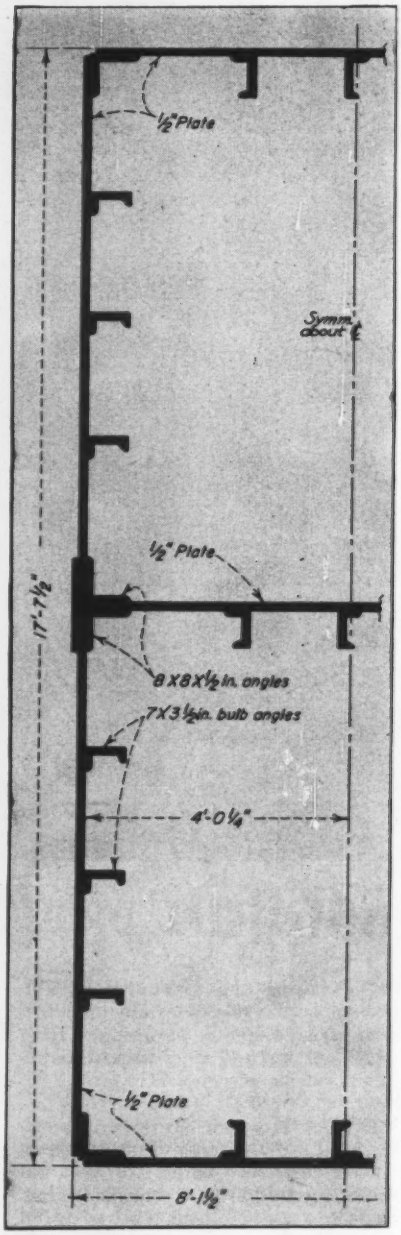
. . . Auditorium will be geared for TV



CANTILEVER FRAME will support no dead loads but its own when the roof sections are distributed about the perimeter; but the sections, when retracted, will impose additional loads. Main box member of the frame is shown in half section at right.



ROOF LEAVES, the main ribs of which are shown above in profile in nested position, form a pocket for the cantilever frame's principal box member, also shown.



lines. The building will be wired also for closed-circuit television.

Three parking lots with a combined capacity of 1,600 cars will be located adjacent to the auditorium. The immediate vicinity will be able to handle 4,000 more.

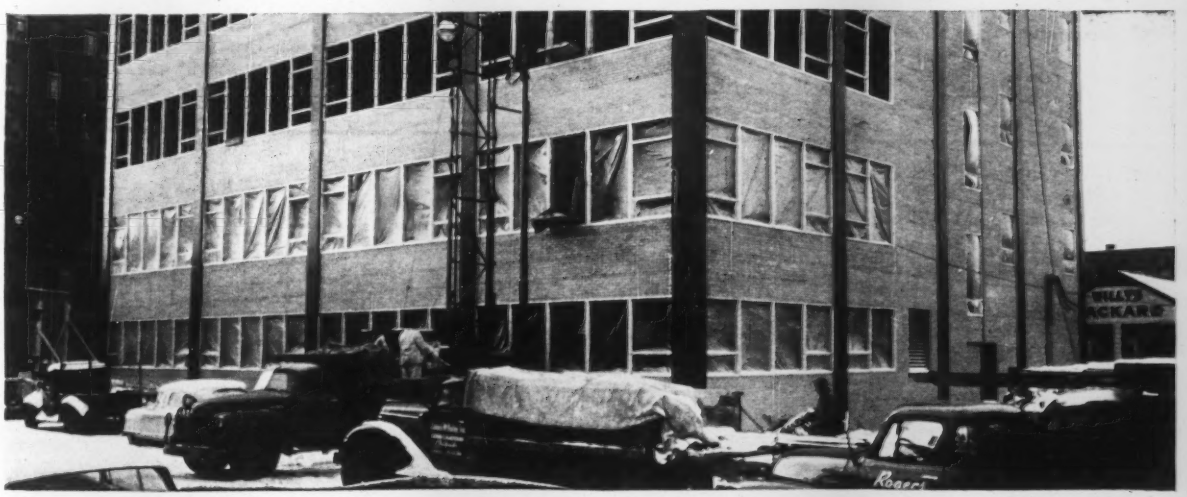
• **Financing**—Bids will be taken for February 12 opening on eight separate contracts: general construction; plumbing; heating, ventilating and air conditioning; electrical; main roof, fixed and movable; main roof, mechanical and electrical; seating; lawns and planting. Equipment will not be included.

Financing for the auditorium will come from a number of sources. Allegheny County and the City of Pittsburgh each will make a $1.5 million capital grant. The public subscribed $2 million in a 1956 fund drive. The Edgar J. Kaufman Foundation probably will donate $1 million. The remainder will be raised by the sale of revenue bonds, with the city and county each making an annual grant to assist the authority in meeting the obligations. The size of the grants will depend on the size of the deficit.

The authority, whose official name is the Public Auditorium Authority of Pittsburgh and Allegheny County, consists of five persons, two appointed by the city, two by the county and one selected jointly. Chairman of the group is Sidney J. Swensrud, and the chief administrative officer is Edward Fraher, executive director.

Consultants to the authority are: Mitchell & Ritchey, architects, Pittsburgh; Ammann & Whitney, designers of the retractable roof, New York City; Robert Zern, structural engineer for work inside and below the ring girder, Pittsburgh; Carl Long, electrical engineer, Pittsburgh; John Mullin, air conditioning, Pittsburgh; Simons & Simons, landscape architects, Pittsburgh; Dzubey & Bedsole, plumbing, Pittsburgh. In the earlier stages of the project, Starrett Bros. & Eken, New York City builders, made a cost study for the authority.

All elements of this construction job in Toledo, Ohio proceed without interruption or slow-down due to cold, thanks to VISQUEEN film enclosures.



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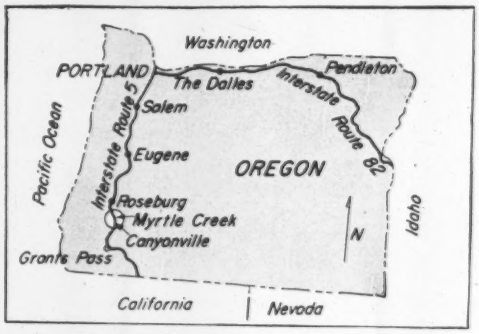
Oregon's New Roads . . .

The interstate highway system in Oregon is a simple matter of one north-south and one east-west road. Total mileage is 295 miles on Interstate Highway 5 (formerly U. S. 99) and 375 miles on Interstate Highway 82 (formerly U. S. 30). In addition, there are peripheral freeways in Portland, or connecting spurs.

Oregon's program ranks 'way down the list—behind some 30 other states which will receive greater appropriations. In 15 years, Oregon is due for $400 million, with some $75 million to come in the first three years (through Fiscal Year 1959). Yet the state has aggressively pursued the program, with some $26 million expenditure for 70 miles of road already programmed.

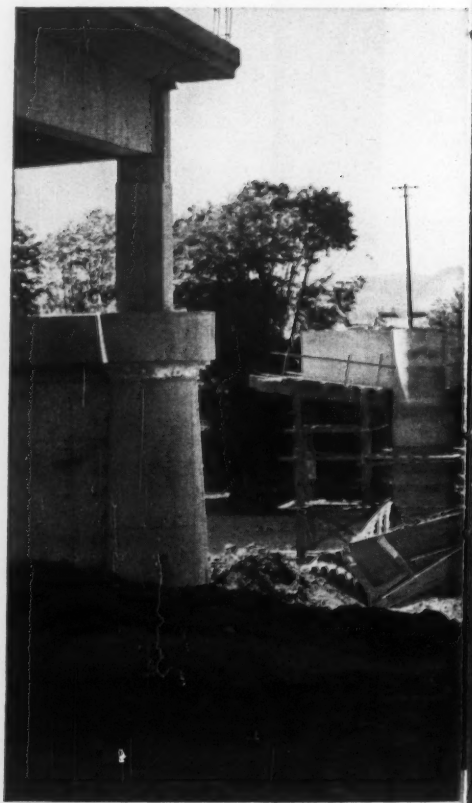


TWO MAJOR HIGHWAYS comprise Oregon's Interstate road share. Circle marks new section of road.

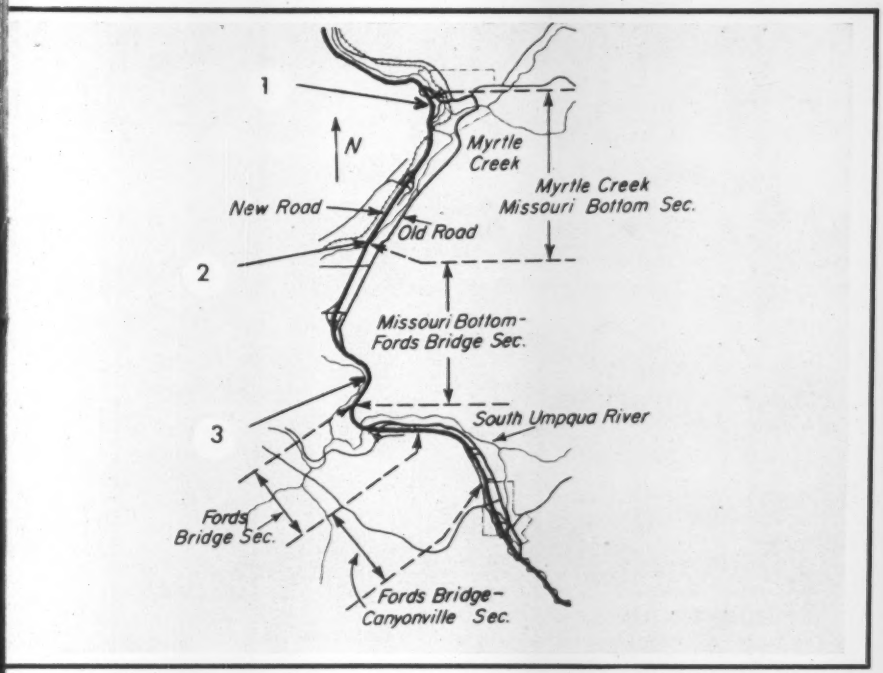
NEW SECTION OF ROAD will bypass two small towns, several old bridges, and be placed above possible flood damage. Numbers locate activity shown in pictures below.

Interstate

HEAVY CUTS require drilling, blasting, shovel and truck operations. Work is on one of the first coordinated interstate highway projects in Oregon (see map above).



BRIDGE CONSTRUCTION includes the river-bottom piers with reinforced concrete



Roads: One State's Answer

A section of nearly 10 miles of interstate highway is nearing completion in Oregon. Grading was substantially finished during the summer of 1957; some of the road is now in use, and the rest will be opened to traffic next summer after paving is completed.

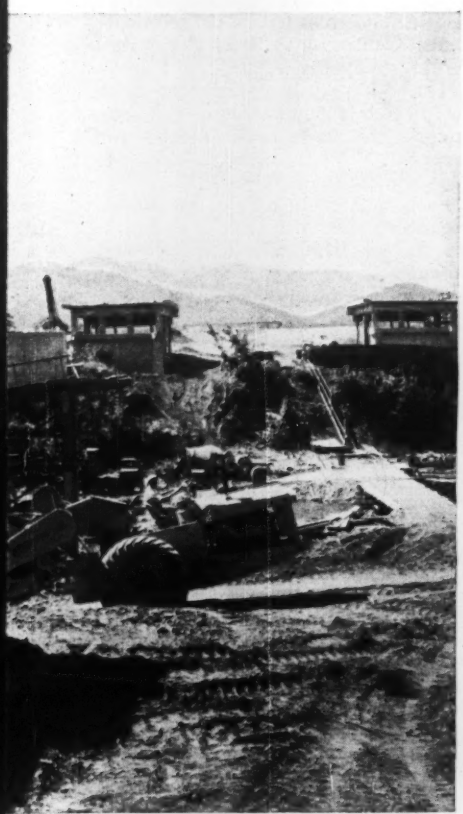
The job, including several grading, bridge and paving contracts, is one of the first—if not the first—projects undertaken and placed in use in the state under the new federal road program.

Located in southern Oregon, on Interstate Highway 5 (formerly U.S. 99) the construction will remove a serious traffic bottleneck by bypassing the towns of Myrtle Creek and Canyonville. In the summer months the existing two-lane road has been jammed with tourist traffic, in addition to heavy logging trucks. To ease this condition, construction of the new four-lane freeway includes heavy rock cuts (up to half a million cubic yards) as well as bridge crossings of the South Umpqua River.

The state has had a freeway law for 20 years and gradually has been converting the interstate routes to freeway standards, with regular federal aid and state highway funds as well as some forest highway money. Result is that Myrtle Creek and Canyonville are the only two towns in a 150 mile stretch between Grants Pass and Eugene not yet bypassed.

Much of the freeway construction in this area is on a two-lane basis, with provision for later conversion to four lanes. Some of the four-lane highway is either not divided or has a very narrow separation strip—particularly through mountainous country where extra lanes were added early to reduce congestion resulting from slow truck speeds upgrade.

The Myrtle Creek-Canyonville construction is not the only interstate construction. Several contracts have been awarded for work south of Salem,



approaches. Plate girders will span between approaches and piers.

TRUCK-SHOVEL OPERATION clears big cut in the middle of the project. Traffic was temporarily detoured on the opposite side of the river.

which, when completed will provide uninterrupted high-speed travel from Grants Pass to Portland, except for a bypass at Eugene. This north-south route includes the R. H. Baldock Freeway from Portland to Salem (ENR March 24, 1955, p. 43).

• **Location complicated**—Location of the Myrtle Creek-Canyonville bypass was complicated by the need to spot the road where it would be safe from damage by the South Umpqua River. Most of the year, the stream is placid, with less than 1,000 cfs flow, but it is subject to sudden and severe flooding —usually in the winter—when volume occasionally exceeds 100,000 cfs. Thus the road bed was kept out of the river valley bottom insofar as possible, and river crossings were minimized.

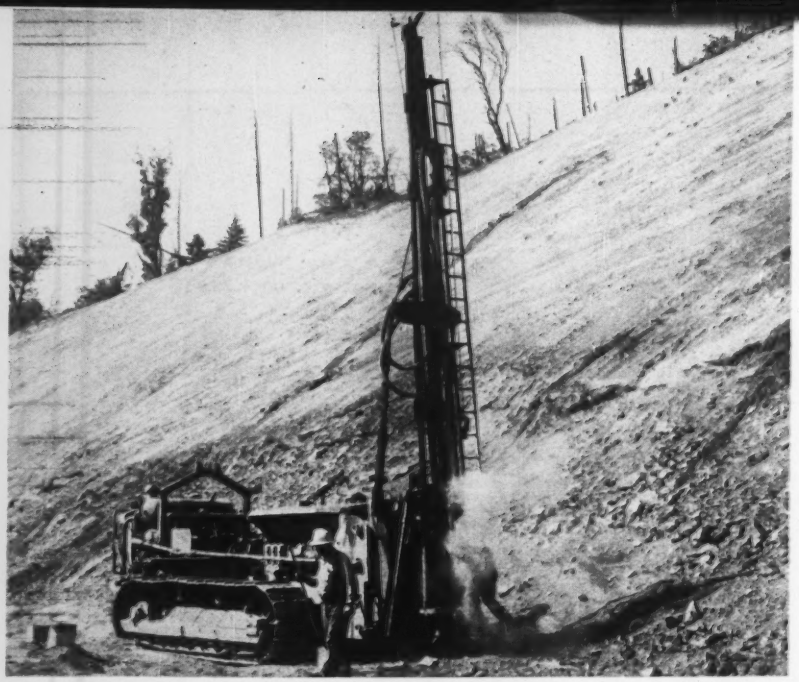
Modernization of the section actually began in 1956, when the old Fords Bridge crossing—about three miles north of Canyonville—was replaced by a steel deck truss bridge with reinforced concrete deck girder approach spans, and a little more than a mile of grading to provide proper approaches.

In 1957, work on the rest of the section was undertaken, under three grading contracts and some bridge contracts. On the section nearest Canyonville (at the south end) alignment coincided with much of the existing route, so that grading and paving could be awarded in one contract to facilitate traffic handling. However, on the northern end of the job, where grading contracts were tackled this year and paving work will be awarded for completion in 1958, the situation was much different.

From the Fords Bridge section north, the job is split in two. Each section is about the same length and involves about the same amount of grading. On the southernmost of the two —awarded to Kuckenberg Construction Co. of Portland, Ore.—the new road follows the alignment of the existing road, with heavy rock cuts pinched between the river and a steep hillside. To provide working room, a detour had to be built with two temporary crossings of the South Umpqua. Even so the heavy grading was required to be finished during the low-water period in the summertime.

On the most northerly contract—held by C. R. O'Neil Const. Co., Creswell, Ore.—there are two heavy cuts of about a half million cubic yards each. Most of the grading on these two jobs is a blasting, shovel-and-truck sidehill operation. One cut, for example, extends for 240 ft on a 1 to 1 slope.

Both contractors (O'Neil and Kuckenberg) have turned to heavy-duty track-laying tractors on which are mounted drill rigs and 500 to 600 cfm compressors. The drill rigs can put down 4 or 4½ in. holes as much as 100 ft deep, although actual depths vary from 20 to 40 ft, with holes drilled on about 15 ft centers.



TRACTOR-MOUNTED DRILLS put down holes for highway cuts. Compressor mounted on rear of tractor provides air for the heavy drill.

One difference between the O'Neil and Kuckenberg work was the blasting medium Kuckenberg used 40% gelatin dynamite sticks. O'Neil, on the other hand, used ammonium nitrate mixed with carbon black. Ammonium nitrate, developed as a fertilizer, is adaptable as an explosive at a considerable savings. In some cases it is hard to detonate, particularly when wet. This tendency is overcome by the carbon black. Even so, a stick or so of ordinary dynamite is usually used to explode it. One other drawback is that the fertilizer emits considerable quantities of noxious fumes.

Not all the grading work is a shovel and truck operations. A considerable amount of it is done by carrying scraper—particularly on the O'Neil job where material from the heavy cuts is transported for river bottom fill.

• **Bridge construction**—Biggest bridge in the current construction program is the Missouri Bottom Bridge, 2½ miles south of Myrtle Creek. This is a twin structure, each section including three plate girder spans of 131 ft, 163 ft and 131 ft length. There are 80-ft-long reinforced concrete deck girder approaches at each end. Central piers are 8-ft-dia single shaft columns with foundations built in sandbag cofferdams.

Being built concurrently is a $236,420 bridge on a county approach road, which includes two 126½ ft prestressed spans. Designed and supervised by state engineering forces, financing is provided by Douglas County through its own funds plus federal-aid secondary funds. Contractor is West Coast Steel Works, of Portland.

This bridge is being built on existing piers that supported a steel truss bridge of inadequate width and strength. Thus, the span is limited to 126½ ft.

Each span includes four prestressed T-girders 6½ ft deep with a 4½-ft-wide top flange. The web is 8 in. thick widening at the bottom to 2½ ft. The cast-in-place girders are spaced 8 ft apart.

Working force is specified as 1,270 kips per beam with the initial force being 1,748 kips per beam. This is provided by 18 tendons of 18 wires (0.193 in. dia) each.

• **The men**—W. C. Williams is state highway engineer for the Oregon State Highway Department. The Myrtle Creek-Canyonville work is under the direction of Frank Morgan, division engineer headquartered in Roseberg, Ore., assisted by L. R.. Chandler, assistant division engineer, with Cecil Gall as resident engineer.

Bridge design is under the direction of P. M. Stephensen with H. H. McClure serving as resident bridge engineer.

On the two major grading contracts, L. E. Hilliard is superintendent for Kuckenberg Construction Co. and C. R. O'Neil is in personal charge of contracts held by his firm.

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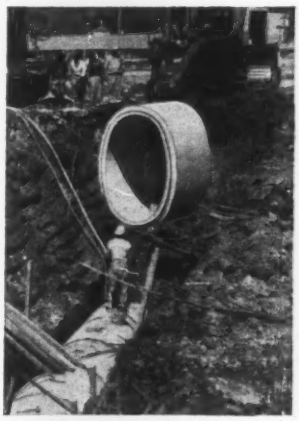

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Rockmoving innovations, exemplified by special frame mounting 13 chainfeeds (above), a world tunneling record and consolidation of the great advances of earlier years are found at . . .

Stornorrfors:

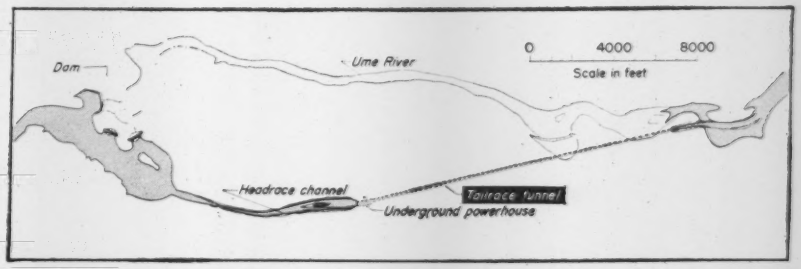
T. Goransson
The Swedish State Power Board*

Stornorrfors underground hydro station, now nearing completion, will be a bench mark in Sweden's—and the world's—rock excavation history. For it brought together the great technical advances of the last 15 years, a large number of significant innovations and a world tunneling record on an enormous project requiring 2.2 million cu yd of underground rock excavation. The project also features the world's largest tunnel.

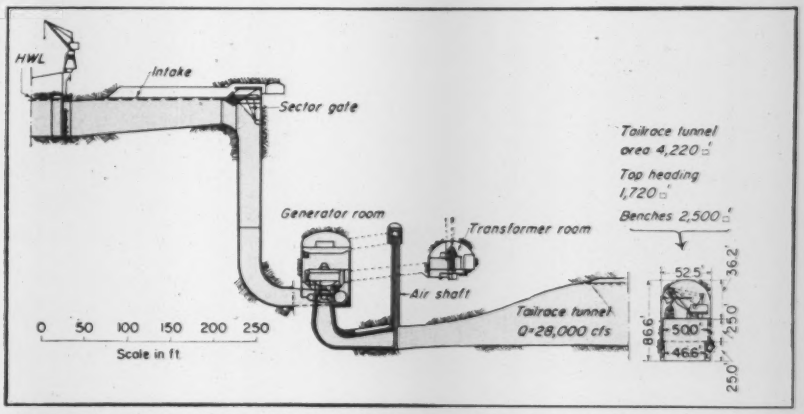
In driving the 1,720 sq ft top heading of this 51 x 85 ft high tailrace tunnel, Swedish tunnelers using one-

*The author was formerly engineer in charge of the Stornorrfors project for the Swedish State Power Board

PUSHER LEG DRILLS were instrumental in setting excavation record in top heading of 4,220 sq ft tunnel, world's largest.



STORNORRFORS PROJECT features 2.5 mile tailrace tunnel designed to convey 28,000 cfs of water from four 178,000 hp Francis turbines, which are among world's largest.



UNDERGROUND ROCK EXCAVATION totals 2.2 million cu yd, most of it from world's largest tunnel, the 52.5 x 87 ft tailrace which was driven by top heading and benching in two stages.

Milestone in Rock Excavation History

man pusher-leg drills removed an average of 38,100 cu ft of rock per day over the full length of the 2.5 mile heading. Although minimum cost, not speed, was the prime objective, this removal rate, it is believed, far surpasses any yet achieved for hard rock —even those calculated on a best week.

More significant, though, are the new methods employed at Stornorrfors. In subsequent benching of the tailrace, a high degree of mechanization was achieved with a special drill rig mounting 13 chainfeeds and drills across the width of the heading.

Cavern work featured special blasting techniques employed to achieve exceptionally smooth rock surfaces.

Roof bolting was prosecuted by a new method whereby long bolts are inserted into holes and grout is forced in under air pressure.

Finally, vertical penstock shafts were excavated in a unusual three-step sequence: A small hole drilled from the surface was enlarged to 8½ ft diameter by driving upwards using a cable-supported cage and finally widened to 26 ft diameter from the top down.

• **Project description**—Stornorrfors station constitutes the largest and last step of a power stairway on the Ume River in northern Sweden descending from the Norweigan border to the sea. The Ume River scheme envisages construction of 20 power stations, with a total generating capacity of 1.5 million kw. Private power companies and the State Power Board are participating in the ratio of 1:2.

Like all other Swedish underground power developments, the Stornorrsfors scheme is simple in concept. It includes a rock gravity dam 4,600 ft long and 75 ft high. A headrace channel 1.5 miles long and requiring excavation of 1.8 million cu yd of earth and 0.9 million cu yd of rock will convey 28,000 cfs of water to three (ultimately four) short, gated intake tunnels. Each tunnel leads to a 26 ft dia vertical penstock shaft that will conduct 7,000 cfs of water under a gross head of 244 ft to a 178,000 hp Francis turbine. The turbines will drive 150,000 kva alternators housed in a cavern 410 x 60 x 92 ft high. Cavern height was held down by development of a 450 ton yoke-type overhead crane that requires less clearance.

Turbine draft tubes, smoothly shaped in rock, connect to the 2.5 mile tailrace tunnel, 4,220 sq ft in section, which discharges into a 1,300 ft long tailrace canal leading into the Ume River. With the future installation of a fourth generating unit, the installed capacity at Stornorrfors will be 500,000 kw. Total cost is estimated at $105 per kw of installed capacity, or about one-third of the cost elsewhere in Western Europe.

Work started in 1953. The first generating unit now is scheduled for operation in October, 1958, and the remaining two are expected on the line by February and June, 1959. Right now, the underground plant is largely completed, except for some benching in the tailrace tunnel. In other words, the Stornorrfors development is sufficiently advanced to warrant an anaylsis of the underground

. . . Stornorrfors: 24 feet a day through 36 x 52 ft top heading

DUMP TRUCKS carry three level jumbo up to face of top heading in two sections. Each weighed 22 tons. Mucking equipment consisted of 4 cu yd shovel and 20 ton dump trucks. Production averaged 1,410 cu yd a day over full length of heading.

operations, particularly those having to do with the tailrace tunnel.

• **Discharge tunnel**—Two discharge tunnels, each of 2,260 sq ft section, were designed originally to accommodate the ultimate 28,000 cfs flow. However, in view of the experience gained on the 2,240 sq ft Kilforsen tunnel, completed in 1953, and the good granite at Stornorrfors indicated by geological tests, it was decided to risk the construction of one large tunnel. If undue difficulties were encountered in the big tunnel, provision was made to revert to the original twin tunnel scheme.

This flexible approach to construction is, in fact, characteristic of all Swedish underground work in rock. In spite of preliminarily geological investigations it is impossible to be absolutely sure of rock conditions underground. Swedish rock projects are designed "in principle", and the final decision is made when the rock has been opened up.

The tailrace has been excavated from three adits, one at each end and one midway. Although the adits permit working of four faces, at no time have more than three been worked, since the project has been paced by the upstream dam.

The three adits have a width of 30 ft, permitting two 20 ton dump trucks to pass. At Stornorrfors, for the first time, floors of the adits, on 1:7 gradient have been paved with concrete or asphalt to reduce road maintenance and increase haulage speed. Substantial savings in tires also have resulted.

• **Top heading**—Choice of method for driving the tailrace was rather obvious, namely full face top heading followed by benching in two stages, as indicated in accompanying drawings.

Lightweight, one-man, pneumatic pusher-leg drills of the Swedish type were chosen. Time and cost of drilling with this equipment are greatly reduced and there is ample experience to show that it is good business to increase the number of holes drilled for a round. Although powder consumption per round becomes somewhat higher, the better fragmentation resulting facilities shovel loading and reduces subsequent boulder blasting.

The blasting pattern evolved and equipment used is shown. Each advance involves drilling of 172 1⅜ in. dia holes to pull about 23 ft. Chisel type carbide bits were used throughout.

The working cycle included three 8 hour shifts, one for drilling and blasting and two for mucking. Advance per calendar day varied between 21 and 24 ft and the record-setting production averaged 1,410 cu yd, or 38,100 cu ft, per calendar day. Mucking equipment consisted of an electric powered shovel with 4 cu yd bucket and 20 ton dump trucks.

Twenty-two drillers at each face worked on a three-level tubular steel jumbo equipped with mechanical jacks. The jumbo was divided into two sections, each weighing 22 tons, to facilitate movement to and from the face by trucks.

The 24 hour cycle broke down as follows:

Drilling and blasting—8 hours	**Hours**
Advance jumbo set holes	0.7
Drilling, charging, wiring	5.0
Withdrawal of jumbo	0.5
Ventilation, bulldozing	0.7
Portal time	0.3
Food break	0.5
Miscellaneous	0.3
Mucking—16 hours	
Advance shovel	0.2
Loading, scaling, withdrawal of excavator	12.5
Bulldozing	0.7
Portal time	0.6
Food breaks	1.0
Scaling of front	1.0
	24.0

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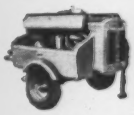
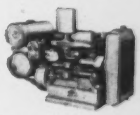
Standard Diesel Pneumatractor



125 Pneumadiesel



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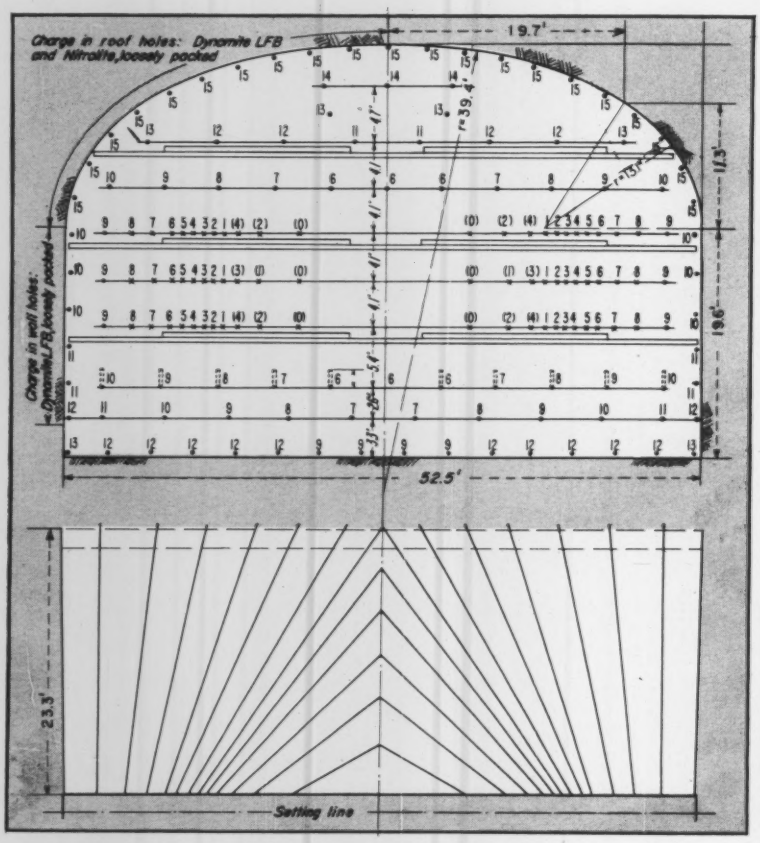
. . . Stornorrfors: Job outran the tools

Rock encountered in the top heading was satisfactory, although it necessitated continuous scaling. Platforms riding the end of a boom mounted on normal truck chassis promoted the speed and safety of this operation.

Although many advanced techniques were employed in driving the huge 1,720 sq ft top heading, this was one phase of the job where the requirements of construction outran the available means.

The experience gained in the top heading indicates the need for some mechanical arrangement, as yet not developed, to orient the holes accurately. The complex drilling pattern depends too much on the skills of the individual operators. Failure of properly angling even an occasional hole will result in undesirable and costly under- or overbreakage. This applies especially to the roof holes.

Top Heading Data



Area	1,720 sq ft
Advance per calendar day	21—24 ft
Volume firm rock per day	1,360—1,500 cu yd
Number of holes	172—176
Explosive consumption	1.35 lb/cu yd
Drillers	22

Explosives: (see drawing) Nitrolite is Swedish granular explosive containing 6% nitroglycerine and 12% TNT. Dynamite LFB contains 35% nitroglycerine with nitroglycol.

Blasting caps: 0.5 sec delay type E, except for detonators in parenthesis which are millisecond-delay type E.

Drills: Atlas Copco Lion with BMT-45 pneumatic feed.

Steel set: $\frac{7}{8}$ in. hexagon; 5.25 ft, 10.5 ft, 15.75 ft, 21.0 ft, 26.25 ft, 31.5 ft.

Bits: Chisel type carbide insert, 1.53 in. dia at start, decreases 0.04 in. each steel change.

• **Benching the tailrace**—In benching, a more satisfactory degree of mechanization has been obtained. The operation is based on a special drill rig designed and built by the State Power Board. On a steel frame extending across the entire 52 ft width of the tunnel, thirteen 19-ft motor driven chainfeeds have been mounted. Feeds are spaced on 5½ ft centers except for the end units, which are set at a distance of 3 ft. Behind each of these two flank feeds is another feed 2.8 ft distant.

Both feeds and the rock drills they mount are lubricated under pressure by a common lubrication system that meters the correct amount of oil. This centrally controlled lubrication system has been instrumental in extending life of the chucks beyond 6,500 ft of holes, and even to 16,000 ft.

The benching rig is skid mounted and is advanced by two air operated hoists. Since the end holes obviously cannot be placed at the walls of the top heading, a 1 ft shelf is being left on each side of tunnel.

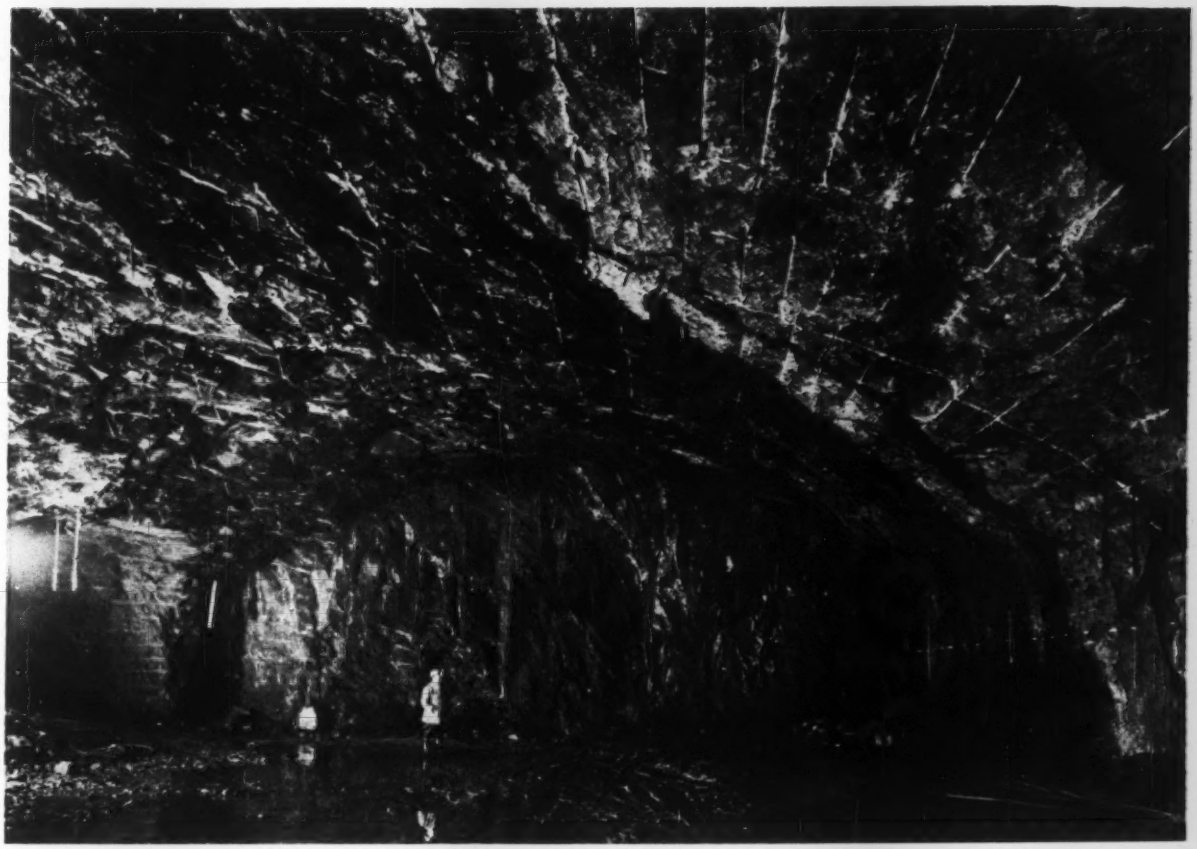
Design of the drill rig is, of course, based on the blasting pattern determined for the 25 ft deep bench. Feeds are mounted at a 26 deg angle from the vertical. Longitudinal hole spacing is 5½ ft, same as the transverse spacing, except for the flank holes, which are spaced half this distance.

Drilling begins by using 6.5 ft long, 1¼ in. dia extension steel with 2¼ in. four point tungsten carbide bits. Two men start the machines and immediately seek safety in a lightly armored service wagon some distance away. This precaution is taken to prevent accidents arising from drilling into any left over unexploded charges in the floor of the top heading.

Once the drills pierce the danger level of the floor, the air supply to the feeds and drills is automatically cut off, and the operators return. A short piece of iron pipe with an inside diameter of 1.8 in. is inserted into the hole and drilling continues using a steel set consisting of 20 ft rod and 1.6 in. bit and 34 ft rod and 1.5 in. bit provided with a 0.3 in. flushing hole and 1 in. by 6 in. rubber collared shank.

About six rows are drilled per shift; thus, four men drill about 2,500 ft of holes per shift.

Holes are charged 200 to 300 ft behind the drill rig using a pneumatic charging device. Bottom charge consists of 13 lb of dynamite LFB (35% nitroglycerine with nitroglycol) packed at 90% consistency, followed by 7 lb of piled sticks of the same grade. Total powder charge per row is 260 lb and an 8 row round is fired by milli-second



SMOOTH SURFACE BLASTING was accomplished in underground generator cavern using care in spacing holes, limiting their length and charging them with a slow acting explosive. Blasting produces a cleaving effect, minimizing fragmentation and fractures.

delays using Type E detonators.

An average of 2,200 cu yd of rock is produced per round, equivalent to a powder consumption of 0.98 lb per cu yd.

Mucking out a round takes two shifts. A 4 yd shovel load 20 ton dump trucks. Close to the bench a bulldozer is employed to scrape together the rock for efficient bucket loading. Mucking proceeds simultaneously with drilling and charging.

Except for a 160 ft length of kaolinized gneiss, the tailrace is unlined.

• **Smooth surface blasting**—Advanced drilling and blasting techniques to obtain exceptionally smooth rock surfaces have been employed at Stornorrfors, principally to save on concrete lining of generator and transformer caverns and surge tubes.

By exercising unusual care in the spacing of holes, limiting length to 10 ft and charging them with a slow acting explosive, the surfaces have been sculptured in the manner shown.

The explosive, known as Gurit, is a Swedish made granular, low velocity explosive containing nitroglycerine and kieselguhr. The charge consists of 20 in. long cartridge paper pipes $\frac{3}{8}$ in. in diameter, which are joined by paper sleeves into a continuous string filling the entire hole. Density of the charge is unusually light, about 2.4 oz per ft of hole. Blasting produces a cleaving rather than shattering effect and causes no fragmentation or fractures in the rock face.

Another new method developed at Stornorrfors concerns roof bolting. Although the rock varied from satisfactory to excellent, there were numerous occasions where the walls and roofs needed reinforcement.

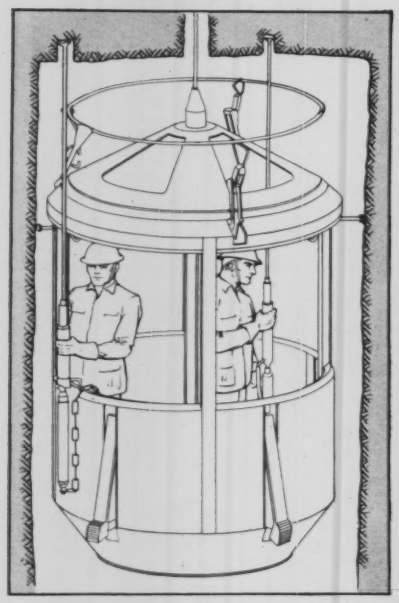
A procedure, subsequently patented as the SN method, was developed whereby long bolts are inserted into the holes and concrete is forced into the holes, beginning from the bottom, by air pressure. Rock bolts held in this manner are capable of withstanding greater stresses and are more reliable than those obtained by conventional expansion anchors. The method has been used for all types of anchoring work.

• **Penstock raises**—The 244 ft vertical penstocks were driven by a method devised for this job, which involved three distinct stages. First, a 6 in. dia hole was sunk by a rope drill, worked from timber trestles above ground, to a gallery previously excavated on the turbine level. A steel cable operated by a hoist above ground was dropped through the hole and connected to a cage.

Two men in the cage provided with stopers drilled and charged an 8.5 ft dia circle of closely spaced holes, after which the cage was lowered to a wagon and removed a safe distance. The round was shot down into the haulage drift and mucked out with a front end loader equipped with a special type of bucket permitting side dumping. While one penstock round was mucked, drilling proceeded in the neighboring raise.

When the raises reached intake level, a circular platform was lowered onto the 8.5 ft dia hole to serve drillers who enlarged the hole to its ultimate 26 ft dia. Closely spaced holes were drilled vertically and the round was shot down through the raise and mucked out through the haulage drift.

The three-step method also has been applied on two 8.5 ft dia transformer cavern raises, a cage shaft, and the ventilation shaft of the surge gallery. Altogether, about 2,300 ft of raises have been driven in this manner, which has proved safe and efficient. It is recommended for shafts exceeding 165 ft in depth. Progress averaged about 300 ft



DRILLERS' CAGE for driving penstock raises to 8.5 ft dia. Raises were enlarged to 26 ft dia from top down.

MUCKING IN TIGHT QUARTERS is aided by special side dumping bucket that is attached to the excavator.

a month, working during only two shifts.

• **Above ground, too**—The 1.5 mile headrace, or supply, canal also involved novel drilling equipment. When passing through rock, the headrace narrows to a channel 62 ft wide and 69 ft deep.

Rock is being excavated in two benches, the top one 23 ft in depth, the bottom one 46 ft deep. A drill rig of the board's design is employed, consisting of four chainfeeds mounting rock drills on 6.5 ft centers fitted to a beam. The rig is mounted to a tractor whose original engine has been replaced by an electric motor.

Two of these rigs, each operated by one man, are used side by side. For drilling, 1¼ in. round extension steel with detachable 2 in. four point carbide bits is used to a depth of 31 ft. A short length of iron pipe is inserted into the hole to facilitate drilling and pneumatic charging. A bench about 100 ft in length is blasted per round, producing about 6,500 cu yd of fragmented rock. Two rounds per week have been fired on the average.

Top rock was mucked by dragline, equipped with a special bucket of tough Swedish steel to stand up to the heavy wear imparted by rock loading. Lower benches, however, are being mucked out by shovel and dump trucks.

OPEN ROCK EXCAVATION was speeded by mounting four chainfeeds on discarded tractors whose engines were replaced by electric motors. Benches are 23 ft and 46 ft deep.

Owing to the convenient location of the Stornorrfors site, a major permanent machine depot and maintenance shop has been established by the board. However, it has been found advantageous to arrange small portable shops close to the working fronts for the sole purpose of rock drill repairs. One rock drill mechanic working eight hours per day was capable of keeping the light equipment used on the top heading in working order.

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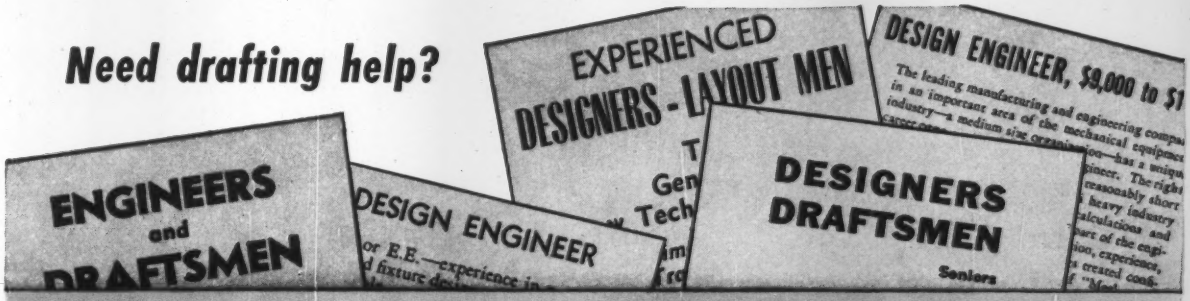

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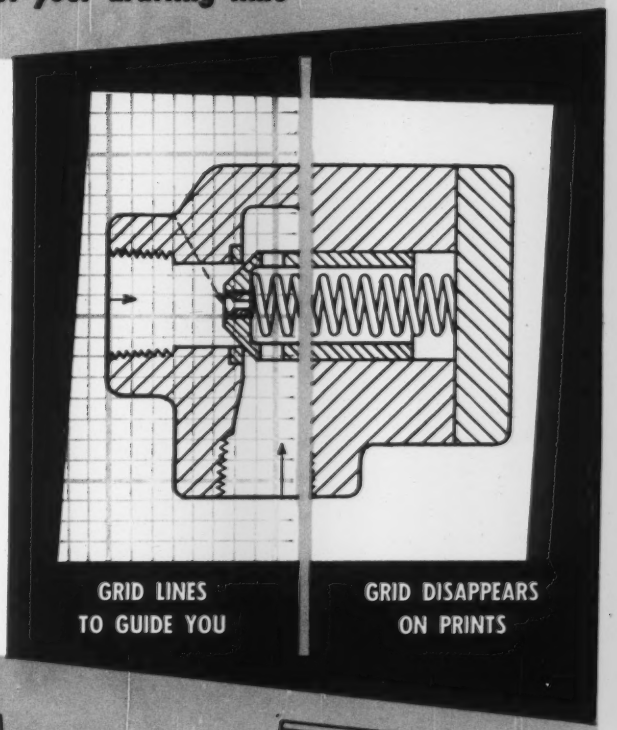

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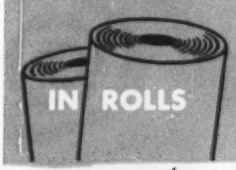

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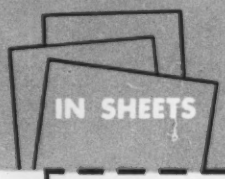

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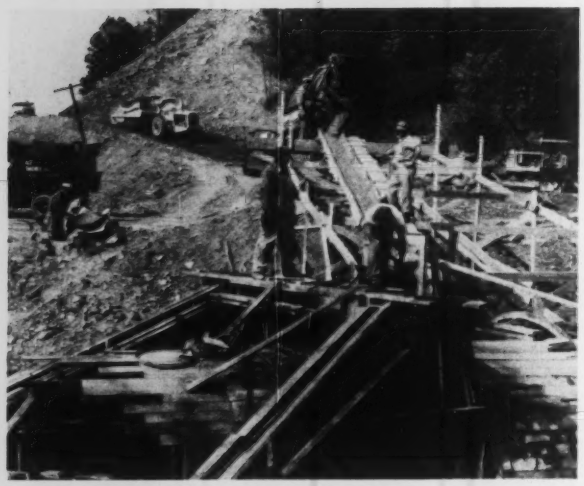

Pouring concrete for one of 3 sub-surface structures designed to carry off surplus water from the re-channeled creek.

Crooked Creek was

When a creek obstructs a 3½-mile road project, a good way out is to move the creek. That's exactly what S. Gavlik, Contractor of Glenwillard, Pa., is doing in order to re-locate Rt. 422 near Indiana, Pa. The entire project, let under the Federal Highway Program, involves 300,000 cubic yards of classified excavation and includes three sub-surface concrete structures to carry off surplus water from the creek.

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Gulf for top quality products and prompt service. Says A. R. Tietjen, Superintendent, "We're extremely well satisfied with Gulf. Can't beat the products . . . or the service. We like the way Gulf has consolidated its product lines, too. This sure cuts down chances of using the wrong lubricant."

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Left to Right: A. Tietjen, Superintendent; R. S. Garrison, Assistant Superintendent; H. H. Hossler, Gulf Representative; S. Gavlik, General Contractor.

Letourneau-Westinghouse 18-yard scrapers making cut for new right of way on relocation of Rt. 422 near Indiana, Pa. S. Gavlik, Contractor on the job, was faced with a creek that blocked the right of way. His solution: move the creek.

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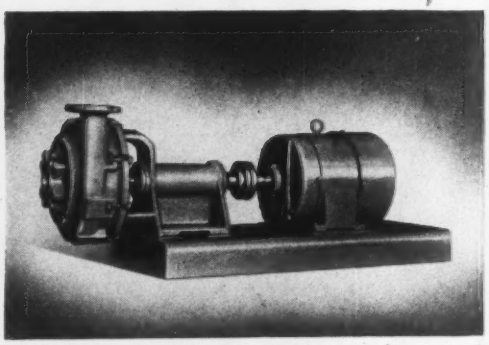
This new, competitively-priced high speed slurry pump was developed by the world's foremost manufacturer of heavy-duty dredging, hydraulicking and industrial slurry pumping equipment. It is designed to handle chemical process slurries and suspensions of sand, coal, crystals, silt, sludge and lime. Its compact but rugged construction assures dependable 24-hour duty in abrasive process handling.



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Factors for Building Runways for Jets

- **Consider settlement as well as bearing in soil tests**
- **What to consider in selecting both base and subbase**
- **Sealevel runways should be at least 11,000 feet long**

Although commercial jet airplanes are now in production and will be in service within about a year's time on U.S. airfields, civil engineers have very little firm information on the characteristics and requirements of these aircraft.

That is the opinion of Perry W. Etkes, a consulting engineer of New York City, who recently completed a four-year tour of building jet aircraft bases for the U.S. Armed Forces, his latest assignment being as chief engineer for the largest Strategic Air Command base in Morocco.

Mr. Etkes' comments were prompted by the fact, he says, that knowledge and experience of the behavior of jet aircraft is very limited, with the only data available being that for military jet performance.

"While it is true that jet manufacturers have made their own data and suggestions as to runway design requirements available, and the Civil Aeronautics Administration has made some suggestions on the subject, it must all be taken with grave caution," Mr. Etkes said. "Most of this is conjecture and empirical, based upon insufficient experience in the field.

"For sound engineering design we must first revise our present concept of what is required of the subsurface underlying the runway. Our design for pavements, on the empirical "K" and "CBR" factors, definitely require revision, since they are on the overdesign side, but do not materially add to the actual strength of the pavement in relation to the actual wheel load or the number of coverages possible."

• **What to consider**—In looking over the features to be considered include: subsurface, topography, drainage, quality of sub-base, wind, rainfall, maximum and minimum temperature and frost.

Some of these factors are being taken care of in design methods for conventional runways, Mr. Etkes adds. Thus, the matters that are specific requirements for jet runways, he suggests, are:

• **Subsurface**—Investigations of the subsurface should not only be concerned with soil bearing, but also with likely settlement, both vertically and laterally. In jet runways, it is absolutely necessary to have a smooth, even surface at all times. Military jet pilots have consistently blamed the unevenness of the surface and sudden sharp changes in grade for overrunning and bad landings.

"There are no shortcuts to subsurface investigations," the engineer says. The suggested boring pattern should set holes not more than 600 ft apart, staggered along the center line of the runway and at 600 ft on either side, parallel to the center line. This will help in settlement studies.

"Borings for undisturbed samples need be only 15% of the total number of drilled holes. However, some auger borings to a depth of up to 15 ft may help in determination of seepage in upper strata. Plate loading tests should be made in excavated pits at 10 ft, but never more than 18 in. above the water table.

The determination of settlement from the bore logs also must take account of some other factors, such as the difference in compaction in the laboratory and in nature, the likely lateral creep, due to shrinkage or slipping on strata planes. The separate strata, as found by the boring, are drawn longitudinally and laterally to large scale with a "no settlement" line at the bottom. Then the cumulative settlement of all the various data are indicated on the drawn profiles, from which the grade changes that are likely to occur will be noted. From this lateral profile, it also is possible to determine any likely creep.

• **Subbase**—The subbase may in part be the original subgrade, depending on its character as found from the subsurface study. In the bad spots, adequate treatment must be rendered to secure a sound runway, since most failures of runways occur at the old subgrade line.

Stabilization may be required, or a suitable core may be necessary to anchor the runway against slippage. Obviously, a good subgrade will reduce the required thickness of pavement because of additional shear resistance, and it is suggested that the subgrade should have a bearing value of 25 psi, even if it is necessary to excavate to 5 ft and introduce select material.

• **Base**—Soils that have the required CBR value when properly compacted, but which are loose and shifting when dry, should not be used.

Generally, soils with a proportion of fines and a plasticity index that makes them suitable for local road construction will be best. This type of soil also will be acceptable for shoulders and overruns. The thickness of the base will, of course, vary with each locality, but should not be less than 5 in. and should have a bearing value of 40 to 50 psi.

• **Pavement**—Best results can be obtained by designing pavement as a road is designed, with the exception that the vertical and horizontal shear factor should be accounted for.

Whether rigid or flexible pavement is chosen, the pavement must be able to carry the loads of the jet planes, up to 300,000 lb by each wheel at a tire pressure of 200 psi. It is the relative maximum shear stress, versus the contact area of pressure, that will determine the thickness of the pavement.

Additionally, attention should be given to a non-slip pavement, because the high speed and the high tire pressure of the aircraft will make this a serious factor.

• **Runway length**—Considering the coming great increases in aircraft load and speeds, it must be agreed that the paved length should be not less than 11,000 ft at sea level and longer at higher altitude or excessive temperature.

In addition, a portland-cement concrete blast pad 300 ft long should be built at each end. The concrete surface should be a rough concrete, with little or no fines, preferably a 2 to ¼ in. aggregate and very rough sand.

The longitudinal grade of the runway should be very gentle and percentage grade change in 100 ft should not be more than 0.167%. A runway width of 150 ft is ample, provided there is a 50-ft stabilized shoulder on either side. The lateral grade, for flexible pavement, should be 1½% and for rigid, 2%.

Notwithstanding the great length of runway it is suggested that an additional 1,000 ft, graded and turfed, be added to the runway as a safety precaution.

(*Continued on page 50*)

Shoulders on either side should be graded to 3% and have the first 50 ft treated with asphalt to keep dirt and gravel out of the jet engines. The remainder should be turfed and maintained in good condition.

• **Drainage**—The importance of drainage, it seems, needn't be pointed out. However, there are a few points requiring extra attention: ground water, natural underground seepage, any likely hydrostatic pressure and the lateral hydrostatic pressure set up along the grade and base of the runway by compaction of the runway and its base.

These factors must be checked and resolved in relation to temperature conditions that may change the water table. In general, it is desirable to have 18 in. piping under the runway every 1,500 ft, to take care of future needs.

Insert Makes Concrete Carrier Out of Tractor

J. C. Goddard, general superintendent of Johnson-Gaylon, Knoxville, Tenn., contractors, solved a construction problem recently by designing and fabricating a "home-made" concrete pour bucket insert to fit into a standard 1½ cu yd bucket of a tractor-shovel.

Cost of the insert was only $162, including material and labor.

Need for the bucket attachment arose when mixer trucks began miring down in soft ground. Reasoning that a crawler tractor would easily overcome the soft soil, Mr. Goddard conceived the idea of the bucket insert, and designed and created it, using ¼ in. steel.

Formed to the shape of the standard shovel bucket, the insert is fastened securely to the existing bucket by two bolts.

A pouring trough is attached in the front of the rig, both to receive material from the mixer and to discharge it into the form.

According to Mr. Goddard, the improvised rig can transport and pour faster and more economically than a crane and regular concrete bucket.

Plastic Film Is Used To Waterproof Lagoons

The city of Edmonton, Alberta, is waterproofing its new sludge lagoons with a strengthened polyethylene film at a seven-fold saving over paving with asphalt.

The lagoons, two of them, are 14 ft deep and hold 12 million gal. About 200,000 sq ft of the plastic film, treated during its manufacture with carbon black for added strength, is being used. Cost in place is running 3 cents per sq ft.

Workers unroll 8 ft wide sheets of the film across the lagoon floor and sides. Then an electrical "welder" heat seals the sheets together. Sand bags are spotted over the film to hold it down before sludge is introduced.

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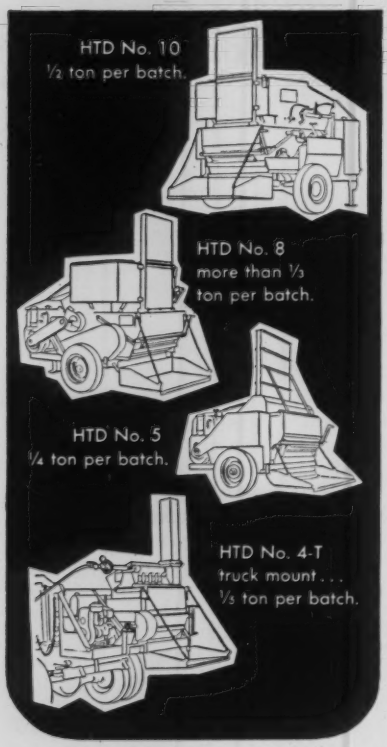

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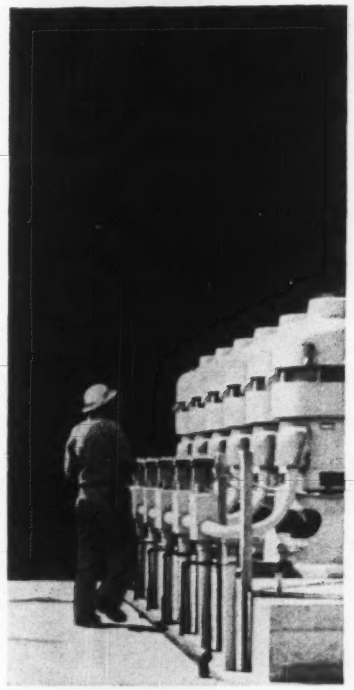

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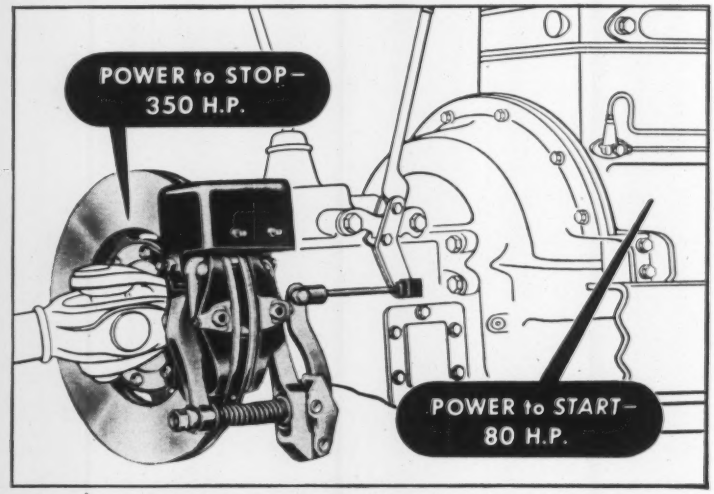
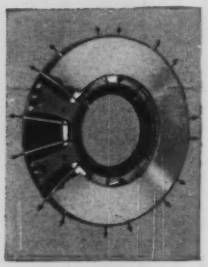


Brakes actually do more work than the engine in terms of horsepower Where it takes 80 HP to accelerate to 20 miles per hour, it takes 350 HP to make a safe stop from 20 miles per hour within required limits



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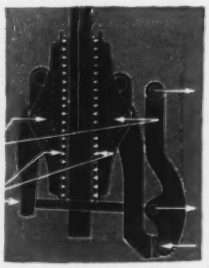

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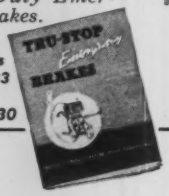

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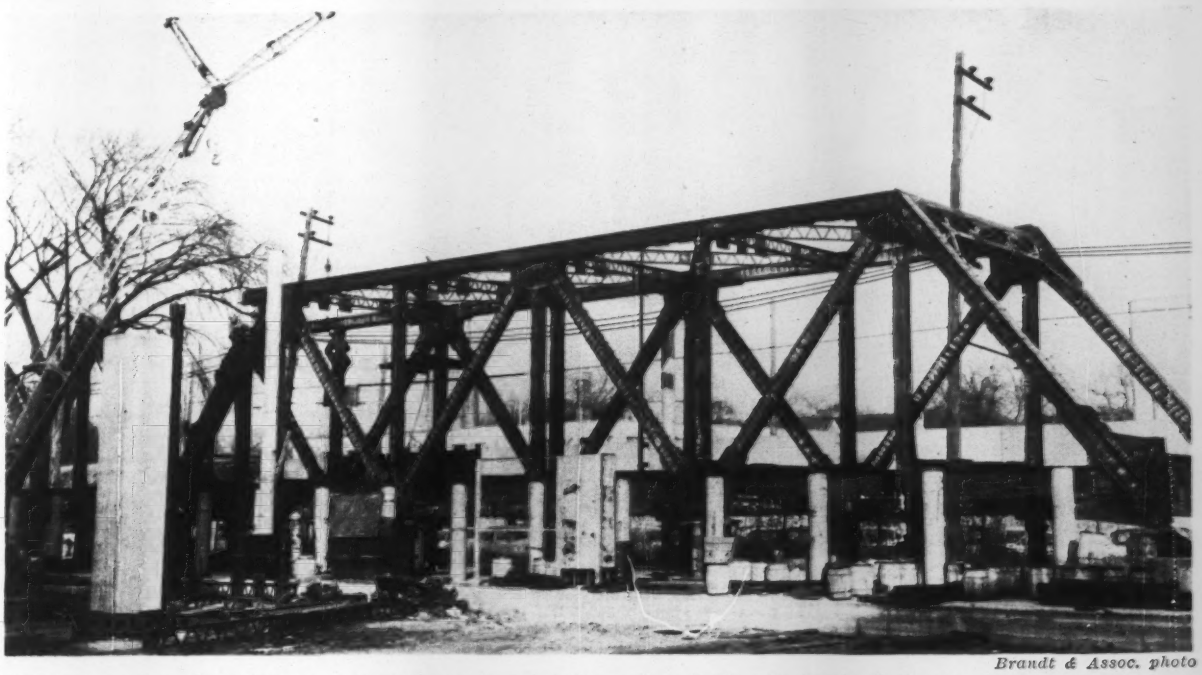


Brandt & Assoc. photo

100-foot replica of 200-foot span bridge will be subjected to hydraulic loads during . . .

Full-Scale Test on a Half-Scale Bridge

Bridge engineers probably will be plagued with problems of structural behavior as long as they design new bridges or repair old ones. But their task should be made easier—and they'll be able to effect greater economies in design—as the result of a comprehensive experimental and analytical bridge investigation at Northwestern University, in Evanston, Ill.

The project will cost about $450,000 for its first five years of operation—including construction of the 100 ft span test bridge now nearing completion, its massive foundation, and both the hydraulic loading system and precise weighing and measuring equipment yet to be installed.

It is a cooperative venture of industry, federal agencies and education. In addition to Northwestern, there are three financial co-sponsors: The Association of American Railroads is contributing $10,000 annually for five years; the Corps of Engineers, $10,000 per year, and the Bureau of Public Roads, $5,000 annually—both on a year-to-year basis.

Northwestern provided the site, paid for the $100,000 foundation of the bridge, contributed $10,000 to get the program under way, and is furnishing the half-time services of the project director, Prof. Lawrence T. Wyly.

Materials and services conservatively estimated to cost $150,000 are donated by 14 companies (see table p. 56).

• **Double-duty bridge**—The bridge is a half-scale model of a 200 ft span railway bridge. It was designed and fabricated so that its configuration can be changed at will, from that of a double-track railroad bridge to that of a highway bridge. The trusses are Warren type, with eight 12½ ft panels. They are 16 ft deep and spaced 16 ft 3 in. c-c.

As erected, the 100 ft span bridge represents its railroad bridge prototype with four lines of stringers framed into the floor beams. A fifth line of stringers will be added, to carry a 6 in. reinforced concrete deck, when the highway-bridge form is used.

The study is planned to be both analytical and experimental. Also, it is planned to study the effects, one at a time, of the many variables that exist when structural steel members are placed under load.

• **Multiple objectives**—The bridge-testing project has many objectives—a number of which already have been scheduled for the next five years. As the work goes forward, however, new questions will arise and additional tests will be scheduled so that the project is apt to become semi-permanent in nature.

One of the first tests to be made will be a study of the load-carrying capacity of the end posts of railroad and highway truss bridges after damage by moving loads.

The objective is to determine the ultimate carrying capacity of these compressive members that have been bowed certain amounts. This would permit the establishment of reliable criteria to guide the bridge engineer in making his decision whether to permit traffic to cross damaged bridges.

• **Existing bridge capacities**—Other objectives of the bridge-testing program include a study of the capacity of existing bridges, by using details and members representative of the majority of such structures. Bridge engineers know that the load-carrying capacity of existing bridges usually is governed by the calculated strength of the compression members.

Moreover, these calculated values are based on certain assumptions and tests on pin-ended or fixed-ended isolated compression members. More knowledge is required as to how these

HIGH STRENGTH BOLTS were used both in making field connections and in shop fabrication of the 100 ft span test bridge, which is supported on rollers at all four corners and anchored at the center of span.

members behave under actual field conditions, when they are parts of a truss.

Another important field of study is the capacity of tension and compression members, with the latest proportions and connections, at both elastic and plastic stresses. One phase of this work will be the study of the strength of truss members with perforated cover plates.

Other scheduled studies in the program include, in broad outline: the effect of initial eccentricities due to out-of-square milling of compression splices in both vertical and horizontal planes; the effect of the participation of the floor system and lateral bracing upon the stresses in the chords; strength of gusset plates, splices and other details in trusses; effectiveness of high-strength bolts compared with rivets for connections, and the effect of vibration upon truss members.

• **Background**—The idea of a full-scale test of a half-scale model bridge is not a new one. In the early 1920's John I. Parcel, of Sverdrup & Parcel, then with the University of Minnesota, suggested such a program to a group of his students, among whom was Lawrence T. Wyly.

In 1946 Professor Wyly presented an outline of such an undertaking at the Cincinnati meeting of AREA Committee 15. The committee expressed interest in the idea but it did not vote to support the project financially until 1952.

This was followed by a similar vote of support by both the AREA and the AAR. The Truss Bridge Research Project was allocated to Northwestern University late in 1955, and several sponsors pledged contributions of funds, materials or services.

• **Substructure**—The 100 ft span bridge rests on a heavy reinforced concrete test bed, which, in turn, is supported on 18 drilled-in caissons, 4 ft in diameter, extending down 72 ft to hardpan. The test bed is 130 ft long and 34 ft wide. Its working deck is a 7 in. reinforced concrete slab supported on 9 cross girders 5½ ft deep by 3½ ft thick, and two 18 in. thick by 24 in. deep longitudinal girders located directly beneath the test trusses.

The four corner caissons support the bridge in a normal manner. The other 14 provide anchor reactions for the fourteen 150 ton hydraulic jacks that will apply test loads. Each caisson is designed to withstand 380,000 lb of upward force.

• **Geometric designs**—Both trusses are designed for the same loading, but they represent two distinct methods of geometric design. One has conventional box-shaped top-chord members with cover plates on top, ordinary lacing along the bottom flanges, and the angles turned outward. Other members of this truss are laced on two sides.

The box-shaped top-chord members of the other truss have their angles turned inward, with top cover plates, but using perforated cover plates along the bottom flanges. The other members have two perforated cover plates.

• **High strength steel**—The principal structural members of the bridge are fabricated of high-strength steel (ASTM A242) having a minimum yield point of 50,000 psi. Additional test members are made of ordinary carbon steel (ASTM A7) with a minimum yield point of 33,000 psi.

For a given test, the high-strength member will be removed and a low-carbon-steel member substituted. The bridge then can be loaded until this carbon-steel member is destroyed, without damaging the remainder of the structure.

Field connections are made with high-strength bolts. Original plans were to shop-rivet the truss members, floor beams and stringers, but the heat of riveting caused too much distortion and strain in the ⅜-in. plates and ¼-in. angles in the bridge members. Consequently, high-strength bolts were used in the shop fabrication.

• **Hydraulic jacks**—Test loads will be applied to the bridge by the fourteen 150 ton hydraulic jacks which have a total rated capacity of 4.2 million lb. They will be centrally operated and controlled to measure loads to within about 1%.

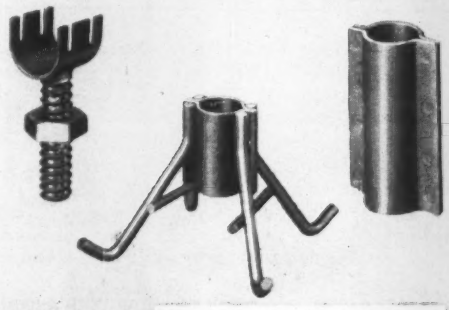
The jacks will be placed on the floorbeams in an inverted position. They will exert downward pressure by pulling against tension rods anchored in the massive reinforced concrete test bed, which, in turn, will be held down by the 14 anchor caissons.

In addition to continuously measuring and recording hydraulic pressures and loading during a test, a large number of electrical and mechanical strain gages will be installed as they are needed.

• **Optical instrumentation**—A third aspect of measurement—dealing with changes in the shape of the bridge as a whole, or of its individual members and their geometric relationship to each other—will be measured by optical instrumentation.

By this precise method it will be possible to measure linear movement of the end of any truss member in three directions, as well as the rotation about any or all three coordinate axes.

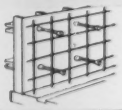
Linear movements will be measured to within 0.001 in. and rotations to within 10 sec of arc. This will be done with a family of highly precise surveying instruments. They will be mounted on an elaborate system of supports surrounding the bridge. These supports will have their own foundations inde-



HEAVY-DUTY SCREED SUPPORTS

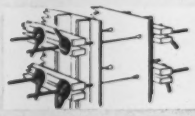
Overpasses and Underpasses

THREADED COIL TIES

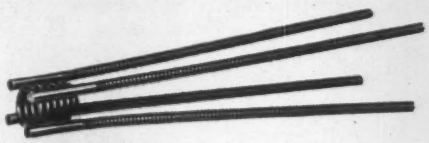


Engineering Structures

TILT LOCK CLAMPS



Heavy-Duty Forming



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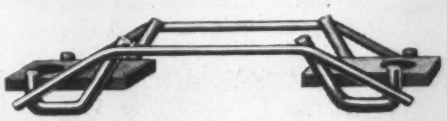
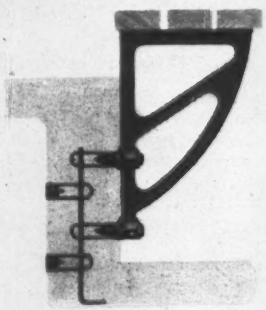


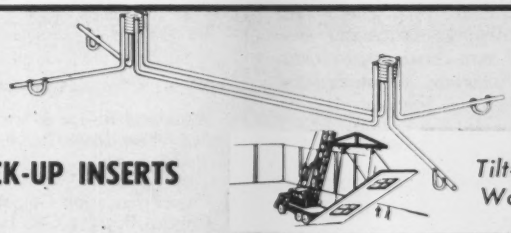
PLATE HANGER FRAMES

Bridge Superstructures



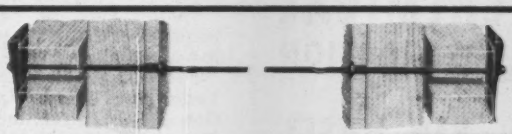
RISER-FRAMES

Stadiums and Grandstands

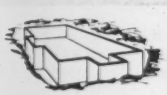


PICK-UP INSERTS

Tilt-Up Work



SNAP TIES



Ordinary Foundations

pendent of the test bed or bridge foundation.

• **Precision measurement**—The bridge is supported on rollers at all four of its corners.

It is anchored at the center of span by diagonal rods extending through the concrete test bed to anchors below. Turnbuckles on the anchor rods permit longitudinal movement of the bridge so that its center line of span can be "zeroed-in" with the optical instrumentation system.

Both the center line of span and the controls of the instrumentation system will be referenced to within 0.001 in. to a precise optical target system mounted on three heavy concrete monuments located beside the bridge and oriented on the North Star. All horizontal and vertical measurements will be taken from these targets.

For horizontal measurements, the "tooling bar" of the optical instrumentation system extending entirely around the bridge will be oriented on the system of optical targets. Vertical measurements will be made from vertical tooling bars mounted on four tall tubes at the sides and end of the working platform.

The entire project will be housed in a 130x34 ft structural steel laboratory building, 32 ft high.

• **Engineers and researchers**—Prof. Lawrence T. Wyly is project director. Harold B. Gotaas is dean of the Technological Institute of Northwestern University and Robert B. Banks is chairman of the Civil Engineering Department.

The bridge was designed by Professor Wyly, assisted by research associates Frank H. Cramer and Barry Chamberlain of England.

The hydraulic loading and weighing system was designed by Gerald C. Ward, research associate and Prof. A. D. M. Lewis of Purdue, consulting engineer.

The optical instrumentation system was designed by Gerald Ward, assisted by the Charles Bruning Co., Inc. Calibration studies by hydraulic jacks were made by research associate Herbert A. Larov, who also was resident engineer on the foundation construction.

The project is operated under the general approval of a 9 man advisory committee, chairmanned by C. H. Sandberg, of the Santa Fe Railroad. Other members of the committee are: E. F. Ball, Bethlehem Steel Co.; R. B. Banks, Northwestern University; E. L. Erickson, BPR; T. R. Higgins, AISC; E. D. Martin, Inland Steel Co.; H. N. Mullins, Corp of Engineers; A. L. Reimer, Wisconsin Bridge and Iron Co.; and E. J. Ruble, AAR.

TABLE OF SPONSORS AND CONTRIBUTORS

SPONSORS (Financial):

Northwestern University
Association of American Railroads
Corps of Engineers
Bureau of Public Roads

CONTRIBUTORS:

Company	Materials or Services
Wisconsin Bridge & Iron Co., Milwaukee	Fabrication and erection of bridge
Bethlehem Steel Co., Bethlehem, Pa.	Hydraulic loading and weighing system; high strength bolts; and furnishing high strength steel (at cost).
Case Foundation Co., Roselle, Ill.	Caissons
Charles Bruning Co., Inc., Chicago	Optical instrumentation
Mississippi Valley Structural Steel Co., Melrose Park, Ill.	Laboratory building
Inland Steel Co., Chicago	ASTM A7 structural steel
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.	High strength bolts
Taylor Forge & Pipe Works, Chicago	Pipe for optical tooling dock
Geo. K. Garrett Co., Inc., Philadelphia	Washers for high strength bolts
Wrought Washer Mfg. Co., Milwaukee	Washers for high strength bolts
Steelcraft Mfg. Co., Cincinnati	Field office
R. C. Wieboldt Co., Evanston, Ill.	Foundation construction without profit
Paul Rogers & Associates, Chicago	Design of foundations
Aeroequip Corp., Jackson, Mich.	Hydraulic hose and connections

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26-3

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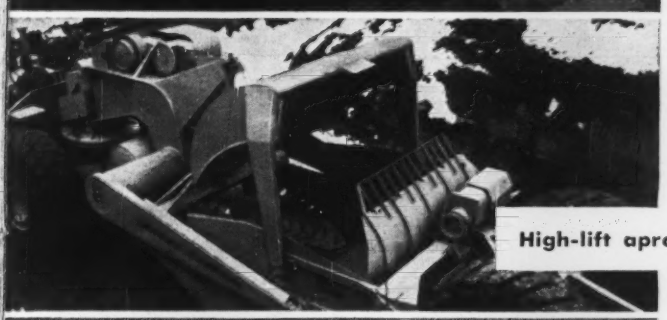
B Tournapull®, with 27-yd. Fullpak, is your fastest-loading scraper for volume earthmoving . . . top money maker for moving big yardages *fast*. You get these advantages in this LeTourneau-Westinghouse machine:



Positive power ejection . . . faster spreading

At the touch of an electric switch, operator moves vertical tailgate forward to eject load. Tailgate wipes bowl clean of mud, marl, or sticky clay in a single pass. Inside of bowl is cleanly designed, no angular obstructions to block material flow. With fingertip electric control, tailgate may be moved to any position in the bowl to create lively boil of material while loading. Curved top of tailgate rolls material into corners for fast fill and rounded heap.

High-lift apron makes sure anything that goes in comes out — fast

Apron lifts quickly to make an opening 10′ wide x 7′1″ high. Plenty of clearance to handle hunks of sod or gumbo, rocks, and other chunky materials. Deflectors on yoke arms prevent trapping of stones and sticky clay that might require manual cleaning. Large-diameter cable-drum on apron-hoist permits fast spooling without kinking, increases rope life. In closed position, apron carries big part of load for better distribution of weight, greater stability.

More visibility . . . assures faster loading and spreading

Operator seat on new "B" is high and left-of-center. He can see blade, load, and pusher merely by turning his head. This makes it easy to position machine for better coordination with push-tractor and see signal for quick break-away the moment load is heaped. He can guide the big machine easily along narrow haul-roads, in the pit, on fill, and over rough terrain.

More speed . . . with instant, positive electric controls

An exclusive advantage on all LeTourneau-Westinghouse earthmovers. With fingertip electric controls, operator handles all movements of bowl, apron, and tailgate. He has power-steering, too, as on a modern automobile. He sits in a comfortable foam-rubber seat . . . with hands resting comfortably on wheel and control panel. No twisting of body or stretching of arms to reach awkward levers . . . your Tournapull operator works relaxed . . . he concentrates on getting bigger loads in less time . . . to give you "more for your money".

Get full details on the B Fullpak. See why it will help you move dirt faster, easier, at lowest-net-cost-per-yard. Write or phone for all the facts.

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Where quality is a habit

stronger, lighter
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concrete floors
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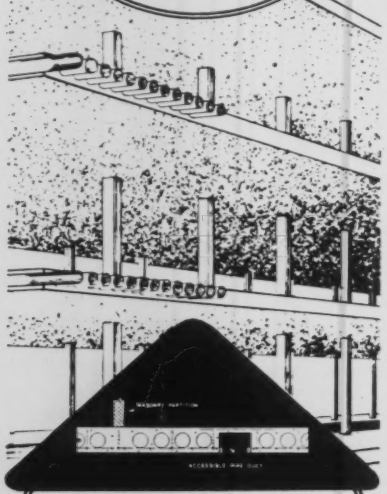

- Reduces construction costs
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Highway Through Narrow Canyon

Excavation is largest item in $1,571,001 contract for bridges, overpasses and four-lane road in Colorado

This $1,571,001 contract calls for overpasses (two double and one single), two single bridges and grading for 2.8 miles of four-lane highway through narrow Clear Creek Canyon in the Colorado Rockies. It is the new Idaho Springs bypass to relieve the old bottle neck from the bottom of Floyd Hill to Empire Junction, where transcontinental routes US 6 and US 40 have to use the same canyon. A second contract will be let for the paving.

Z. H. Lowdermilk, Inc., Englewood, Colo., the low of seven bidders, was 1.1% under the second bid and 1% over the engineer's estimate. Mark U. Watrous is Colorado's Highway Engineer; Reuben C. Hopper is resident engineer at Idaho Springs.

Work involves over 641,000 yards of excavation; 2,540,000 station yards, and 84,600 yard miles of overhaul; 2,965 yards of concrete and 324 tons of steel.

There is housing within the heavy blasting area, and 23 structures will be removed.

Class A concrete is specified (six sacks per cu yd). Materials will be transported by truck. The railhead is 35 miles from the site.

Wages on this job will include: Unskilled, $1.979; semi-skilled, $2.132; truck drivers, $2.487; wagon drill operator, $2.385; shovel operator, $2.994; all including fringe benefits.

This is how the bidding went:

1C	Z. H. Lowdermilk, Inc., Englewood, Colo	$1,571,001
2	H. & E. Lowdermilk, Inc., Englewood, Colo	1,588,593
7	N. W. Eng. Co., Denver, Colo	2,144,234
EE	Reuben C. Hopper, Resident Eng., Idaho Spgs	1,556,689

Bids: 10-8-57 Items	Unit	Quantity	Unit Prices 1C	2
Clear and grub	ls	job	$55.000	$55.000
Remov bri and log RW	ls	job	15.000	3.000
sta 41+	ls	job	12.500	4.000
conc sidewalk	sf	1,750	0.10	0.20
manhole	ea	9	50.00	50.00
23 structures	ls	job	2,300	1,150
conc box culv	ls	job	1,000	1,000
fence	lf	3,200	0.10	0.20
guard fence	lf	2,040	0.70	0.50
Plug culvert	ea	2	25.00	50.00
Exc, uncl	cy	635,000	1.45	1.40
ditch, uncl	cy	1,900	2.50	1.75
Stripping	cy	500	0.10	0.20
Exc struct, uncl	cy	2,240	5.50	3.00
rock, str	cy	530	10.00	12.00
common, str	cy	831	5.00	12.00
Struct bkfl, Cl 1	cy	3,760	3.00	4.00
Mech tamping	hr	670	7.00	7.00
Roll, tamp R, 2 unit	hr	1,410	10.00	10.00
4 unit	hr	80	11.00	12.00
FWR, 3 whl	hr	10	10.00	7.00
RTR, 1 unit	hr	50	10.00	7.00
2 unit	hr	10	11.00	9.00
Furn, TR, 2 unit	ea	1	200.00	100.00
4 unit	ea	1	210.00	100.00
FWR, 3 whl	ea	1	150.00	100.00
RTR, 1 unit	ea	1	125.00	100.00
2 unit	ea	1	140.00	100.00
Wetting	Mgal	9,750	0.50	1.50
Overhaul sta yard	sta y	2,540,000	0.02	0.02
yard mile	ym	84,600	0.20	0.20
Detour surf	cy	2,200	3.00	3.00
Asph rd matl, MC	gal	1,400	0.40	0.50
surf plt mix	t	270	9.00	10.00
Tr bridge timber	Mfbm	2.5	500.00	500.00
Conc, Cl A	cy	2,965	62.50	80.00
Stl, reinf	lb	577,000	0.135	0.14
struct	lb	70,300	0.25	0.26
Relay pipe, 24"	lf	60	3.00	6.00
60"	lf	46	10.00	40.00
CCP, reinf, 18"	lf	210	7.50	8.00
24"	lf	100	9.50	10.00
CMCP, 8", nest	lf	224	5.25	5.00
18", nest	lf	100	6.00	8.00
12"	lf	282	4.00	5.00
18"	lf	460	5.50	6.50
24"	lf	2,816	7.50	7.50
30"	lf	542	8.50	10.25
36"	lf	254	14.75	14.25
60"	lf	212	30.00	32.00
MP, CMPC, 120"	lf	203	85.00	75.00
Stl piling (12BP53)	lf	240	10.00	12.00
grtd rubble slope & ditch pave	cy	40	40.00	50.00
Riprap	cy	406	6.00	8.00
Met cribbing, Design A	sf	322	6.75	5.00
B	sf	747	7.80	5.50
C	sf	815	8.70	6.50
D	sf	975	9.50	7.00
Fence, wire comb	lf	7,000	0.50	0.50
ch link mesh fx 6'	lf	8,923	3.50	4.00
9'	lf	600	5.25	5.00
Gate, dble driveway	ea	1	200.00	160.00
ch link, walk	ea	1	150.00	60.00
Sht copper, 32 oz	lb	150	3.00	5.00
Markers, rt of way	ea	30	15.00	25.00
Conc sidewalks	sf	400	0.50	0.90
Drain pipe, 4" x 1' 6"	ea	2	10.00	10.00
4" x 2' 0"	ea	12	12.00	11.00
Elec cond jct B, 1½"	lf	270	1.50	2.00
Met apr, CMPC, 18"	ea	1	35.00	30.00
24"	ea	10	50.00	50.00
36"	ea	2	125.00	125.00
Plastic pipe, 6"	lf	300	6.50	8.00
Manholes	ea	3	400.00	500.00
Inlet grating and frame No. 12	ea	1	65.00	60.00
13	ea	9	75.00	80.00
median	ea	12	75.00	48.00
subway T	ea	4	200.00	100.00

Commence 10/21/56. Completion 270 cal/days.

Gas Main Cross-Tie at Fort Devens, Massachusetts

At an approximate average cost of $12.88 a foot, including plug valves and boxes, R. H. White Construction Co., Inc., Auburn, Mass., got the job of laying 240 ft of 8 in. and 100 ft of 6 in. steel gas pipe at Fort Devens, to make a cross-tie between gas mains. His lump sum bid of $4,380 was 18.9% below the estimate of the U. S. Engineers' New England Division, and only $15.00 below the bid of the New Hampshire Tree Service (Andover)—the second bidder out of three. High with a bid of $4,636, was Tulsa Contracting Co., Inc., East Providence, R. I.

Concrete is Class A, specified to test 2,500 psi at 28 days. Contractor furnishes all materials, which can be shipped by truck or rail.

Completion of the project is scheduled for 35 days after receipt of notice to proceed.

Why you need grader GO-*power*

Adams* 8-speed constant-mesh transmission gives you more full-power speeds for grading, maneuvering, traveling

It's just common sense: The faster your grader works... the more jobs it completes... the lower your grading costs. That's why LeTourneau-Westinghouse equips every 80 to 150 hp Adams grader with a transmission that gives you 8 forward speeds, 4 reverse, plus 3 (optional) creeper speeds. You get the extra GO-*power* of 15 full-power speeds... so your operator can apply maximum grader power on almost every work, maneuver, or travel operation. Here's how it pays off:

Up to 28% extra blade-work

For the ordinary run of grading jobs, these heavy-duty Adams graders have 4 efficient work speeds... compared to only 3 on most other graders. With more speeds at which maximum engine horsepower can be used, Adams machines move more dirt... produce more work in a day's time.

For example — on average grading work, a 115 hp Adams 440 works in third gear (4.6 mph). Other graders of similar size, not having this extra power-speed combination, have to shift down to 3.6 to 4.0 mph. That's because their third gear is much too fast, and less powerful. On such a job, the Adams does up to 28% more work. It will give you similar extra output on almost any task you can name.

Adams 2 intermediate speeds — around 10 and 14 mph — give added speed for maneuvering, and climbing tough grades. Practical travel speeds to 25 mph move these high-production graders quickly from job-to-job.

Bonus output on one-way work

Most graders have only 2 reverse gears, to 7 mph. Adams 80 to 150 hp machines have 4... 2 for blading, 2 for fast back-up. Again, you get more blade-work done with more speeds. Often your operator works a section where it's impractical or impossible to make turn-arounds... so he backs-up. Adams higher reverse travel speeds (8 to 13 mph) get grader back to its starting point fast... convert otherwise wasted reverse travel time to bonus blade-work. On average shuttle-grading jobs, where graders may work at similar speed, an Adams with 13 mph reverse, makes 5 blading cycles in the time it takes other machines (top reverse about 7.0 mph) to make 4.

Faster completion with extra power... precise control

Adams optional creeper gears provide 3 full-power operating speeds *as low as 35' per min.* These low-low speeds give you work-power to take a big cut while blading slowly... concentrate full engine horsepower for scarifying old roadways and blading thru rocks, roots, etc.... help you prepare precise finish grades... save time when working and maneuvering in close quarters.

Added work-power is FREE

Adams graders cost no more than other graders of similar size and power. Whether you need 80, 115, 123, or 150 hp, you get the extra work-power of Adams 12 standard speeds — in constant-mesh transmission — *without extra charge.* Creeper gears are optional, at nominal cost.

Call or write for details, and a demonstration of GO-*power* in action.

*Trademark G-1460-G-1

With 4 reverse speeds to 13 mph, Adams heavy-duty graders back-up fast... complete upwards of 27% more round-trip work-cycles on one-way blade-work, than other similar-size machines.

Extra GO-power

Adams POWER-*Flow** *660* gives you the effective push-power of an *infinite number* of gear ratios, at speeds from 0.0 to 27.4 mph. Heavy-duty grader applies 190 hp thru 3-to-1 torque converter. Working weight: 30,200 lbs.

Medium-weight GO-power

15,500-lb., *60 hp Model 220* has available 10 full-power speeds... leads its size-class with 5 forward, 1 reverse, 4 optional creeper speeds.

LeTOURNEAU-WESTINGHOUSE COMPANY, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

Where quality is a habit

Materials and Labor Prices

Monthly Market Quotations by ENR Field Reporters

See following ENR issues for OTHER PRICES

- Cement, Aggregate Ready-mixed Concrete, Asphalt: Last, Jan. 9; Next, Feb. 6
- Iron and Steel Products, pipe: Last, Jan. 16; Next, Feb. 13
- Wage Rates, Building Board, Lath, Insulation: Last, Jan. 2; Next, Feb. 27
- Wood Products, Glass Explosives, Chemicals: Last, Jan. 23; Next, Feb. 20

STRUCTURAL CLAY BUILDING TILE, BRICK AND LIME—DELIVERED

	STRUCTURAL CLAY TILE PARTITION—SCORED Per M. lots of 2,000 pieces or over, 3x12x12 in.	4x12x12 in.	8x12x12 in.	STRUCTURAL CLAY TILE—LOAD BEARING—SCORED Per M. lots of 2,000 pieces or over, 8x12x12 in.	10x12x12 in.	12x12x12 in.	BRICK Per M. In quantity Common backing	Straight hard	LIME Per ton, in paper, Carload lot, Hydrated finishing	Common hydrated	Pulverized or lump
Atlanta	$149.90p	$149.90p	$290.80p	$334.55p	.....	.....	$30.50p	$32.70p	$23.50	$24.50	$.....
Baltimore	203.00	217.00	406.00	465.00	596.00	681.00	36.00k	41.00k	33.00	22.00	.....
Birmingham	135.00p	152.00p	.....	303.00p	376.00p	465.00p	27.00ff	38.00y	35.02	22.30	26.33g
Boston	232.00†	348.00†	463.25†	556.00†	.....	.....	41.50p	46.50p	39.20†	31.20†	.....
Chicago	135.00	145.00	280.00	.....	.....	.....	30.00	32.00	38.00	35.20e	.....
Cincinnati	205.00j	225.00j	296.00jdd	213.00j	288.00j	314.00j	48.75j	47.00j	30.04j	26.04j	30.04j
Cleveland	209.00	223.00	.....	475.00	.....	.....	41.00	51.50	31.00	25.00	.....
Dallas	152.00	152.00	300.00	364.50	446.25	552.50	26.75	45.25	41.80	24.58	28.50
Denver	.....	.....	.....	.....	.....	.....	31.50	49.50	46.00p	42.00p	46.00p
Detroit	273.00	298.00	545.00	.....	662.00	755.00	47.50p	48.00p	38.00	30.00	.....
Kansas City	158.00	158.00	312.00	312.00	400.00	500.00	33.00	33.00	36.26	34.26	29.76
Los Angeles	r	r	r	r	r	r	32.50k	.....	38.00	38.00	39.00
Minneapolis	188.00p	210.00p	429.00p	210.00pw	.....	.....	48.00xp	52.50y	47.00bbe	37.00bbe	49.00bbde
Montreal	170.00au	178.00au	325.00aus	270.00q	400.00q	.....	48.25b	56.30b	39.00	22.00	13.25
New Orleans	186.00	186.00	380.00	380.00	.....	.....	40.00	55.00	44.00	32.00	32.00P
New York	175.30h	187.03h	280.40h	283.00hn	.....	.....	44.00	.....	38.00	35.00	.....
Philadelphia	169.00	180.20	337.90	405.00	.....	.....	30/34	38/42	27.60	25.60	3.17m
Pittsburgh	147.50t	157.75t	295.00t	335.00t	435.00t	500.00t	39.00t	46.00t	32.00t	28.00t	.....
St. Louis	178.50	185.00p	391.00p	401.00p	459.00	621.50	43.00l	41.50	0.95aa	.80aa	1.35s
San Francisco	158.85*	177.10*	235.30dd*	.....	.....	.....	43.00*	43.00*	27.75	27.75	30.50i
Seattle	231.00p	270.00p	490.00p	26.00pw	.....	.....	48.00	62.00	52.00bb	38.00bb	4.50mbb
Toronto	146.00	157.00	289.00	234.00f	395.00	.....	35.00	63.00	36.00	33.50	31.50

*a F.o.b. Yard. **e F.o.b. plant Stockton. *t F.o.b. yard Roxbury. *n Smooth. lots. *o Provincial and Municipal tax extra. *r Not used: earthquake danger. *s 8 x 16 x 12. *t 2% cash. *u Incl. Federal tax. *v Sand lime. *w 5 x 8 x 12-in. $4.50 del. *x 8 x 12 x 12 in.-3 cell. *d Pulverized hot. *e 5%, 10th following month. *f 8 x 8 x 12. *g Lumps, $26.72. *h F.o.b. trucks, lob site N.Y.C. *i 60 lb sacks. *j Truck load or over. *k $1.00 discount. *l Red fare. *m Per bbl., 180 lb. processed. *n 7¾ x 7¾ x 12. *o Mason's double hydrated pressure. *p Truck *y Chi common. *z Pebble: 80 lb sack. *aa 50 lb sack. *bb LCL. *dd 8 x 12 x 12. *ff 80% common. *gg Rough. $40.00 smooth.

PAINT, ROOFING—F.O.B. CARLOAD LOTS

	RED LEAD Per 100 lb. in 600-lb. (Approx.) bbl. Dry a	WHITE LEAD Per 100 lb. in 100 lb. cases In oil w	READY-MIXED PAINT Per gal., drums Graphite b	Aluminum c	Ferric Oxide d	ROOFING SUPPLIES; Carload lots f.o.b. factory Rolls, slate surfaced, 85-90 lb. per sq.	Asphalt felt, per 100 lb.	Tar felt, per 100 lb.	Asphalt coating per gal.	Tar pitch 360 lb. bbl. per ton
Atlanta	$16.50	$30.125	$3.50	$3.86	$3.81	$3.39	$2.20	$2.62	$0.67	$57.75
Baltimore	16.25	29.75	3.00	4.40	3.50	2.78	4.25	4.25	.48	50.18
Birmingham	16.50	30.125	3.90	3.40	....	3.09	2.29ii	2.29ii	.82ff	45.00ee
Boston	16.25	29.75	....	....	....	3.63g q	2.83oq	2.83oq	.50q	58.00q
Chicago	16.25	29.75	....	....	....	3.60tu	2.98to	2.98to	46.00tbbo	57.70t
Cincinnati	16.25	29.75	....	....	....	3.13	2.70	2.73	.428y	55.96
Cleveland	16.25	29.75	2.57pvv	2.63m	2.97qq	3.73q	2.85o	2.85o	.501y	49.00qq
Dallas	16.50	30.50	....	3.20B	....	2.95u	2.95o	2.95o	.484	65.00kk
Denver	16.75	30.25	3.98	3.20	3.70	2.63	2.50o	2.40o	.438	50.00
Detroit	16.25	29.75	2.70	3.95	2.70	3.30	2.54f	2.409f	582ff	47.30
Kansas City	16.25	30.50	3.99	3.43	3.01	3.20ii	2.14o	2.14o	.63y	.....
Los Angeles	16.25	30.00	3.30n	4.50n	4.20n	3.20n	2.15en	i	70ny	i
Minneapolis	16.25	29.88/29.75	....	....	....	2.99	2.41hi	2.41hi	.442i	50.00r
Montreal	.....	.....	5.02Dfi	5.04zfi	4.65kfi	5.40	4.65f	4.65f	1.60	.....
New Orleans	.....	.....	.....	.....	.....	3.09	2.29	2.85	0.680	.....
New York	15.25C	29.75	.....	.....	.....	3.19	2.45o	2.45o	.425s	49.00*
Philadelphia	16.25	29.75	3.60	3.40/3.65	3.50/4.80	3.00/3.30	2.54o	2.54o	.37/.45	48/54
Pittsburgh	16.25	29.75	2.20dE	2.25dF	2.25dG	3.37s	2.59s	.....	.45	.....
St. Louis	16.25	29.75	.....	.....	.....	3.70iis	2.75kk	2.75kk	.46ty	64.00
San Francisco	16.25	30.00	3.20	4.30	3.50	2.69	2.09aa	3.10	.47jj	54.00
Seattle	16.25	30.25	3.47	4.19ee	....	3.82pee	3.30kee	.....	.50ee	51.40ee
Toronto	.....	.....	5.00	5.75	5.50	4.45	4.10e	3.30o	1.70j	62.00A

*t Delivered. * Note: Red lead in oil 50% higher than white lead in oil. ** Aver. wt. approx. 425 to 550 lb drums. *a Red lead prices change frequently due to pig lead price changes. *b U.S. War Dept. Spec. 3-49A. *c ASTM Spec. D268-31. *d 80% minimum ferric oxide. *e 15 lbs. *f Per 432 sq ft. *g F.o.b. yard, Roxbury. *h Per roll, 65 lb. *i Net carload prices, Minneapolis and vicinity. *j 45 gal containers. *k Over 80% ferric oxide. *l Not used. *n F.o.b. city. *o Per 60 lb roll. *p 6-drum, 50 gal each. *q Per 90-lb roll. *r F.o.b. factory, Chicago. *s Truckload. *t Incl. Federal tax. *u Per 90-lb square. *v Per ton. *w Price to contractors $1.25 less. *x Ready-mixed. *y 55-gal container. *z Drums. *aa 15 lb. sq ft. *bb Roofers coating and cement. *cc LCL, truck delivery. *ee Asphalt pitch in 100 lb package. *ff 5-gal drums. *gg F.o.b. factory. *hh Incl. freight. *ii Per roll. *jj Asbestos roof coating. *kk 400 lb barrels. *ll ASTM Spec. D982-49. *C 95%. *D Std. black. *f Milit. spec.: E TTP27; F TTV81; G TTP31. *H Not quoted after Oct. 1957

PLASTER, VERMICULITE AND METAL BUILDING SHEETS & TUBING

	PLASTER‡ Neat per ton	Gauging per ton	VERMICULITE‡ Home Insulation pellets	Plaster aggregate	Concrete Aggregate Untreated per bag of 4 cu ft	PERLITE‡ Plaster Aggregate	Concrete Aggregate Untreated	ALUMINUM SHEET†† Flat .102" th 36"x96" & 48"x144" per lbjt	Corr roof .032" th 35"x12' per sht	STAINLESS STEEL† SHEET-TYPE 302g 20 ga 48"x96-120" per cwtkk	28 ga 36"x120" per cwtmm	COPPER WATER* TUBING-TYPE L 2000 ft lots per ft ½"b	⅝"e
Atlanta	$31.00	$36.00	$1.55a	$1.65a	$1.80al	$1.65	$1.65	$0.422n	$8.97n	$61.44n	$67.50	$18.74f	$23.41f
Baltimore	23.25	33.65	0.95	1.15	1.15	1.15	1.65	0.431	0.489r	56.25	64.25	0.1874	0.2341
Birmingham	33.00	39.00	1.55	1.55	1.80N	1.55	1.55	0.466	10.48	67.34	76.09	0.1608	0.2244
Boston	22.00	30.00	1.40	1.40	1.45	1.45	1.50	0.466	30.10p	65.42dd	71.92ddff	0.1608	0.2244
Chicago	26.80	26.80	1.55	1.60	1.60l	1.60	1.60	0.506z	10.376a	65.15aee	73.90aee	0.1608	0.2244
Cincinnati	28.00*	28.00*	1.75	1.75	1.75	1.85	1.90	0.434	9.56	65.28	74.03ff	0.1608	0.2244
Cleveland	26.50	43.00	1.13k	1.16ii	1.24l	1.45	1.45	0.506aa	8.66	65.33oo	74.08oo	16.08f	22.44f
Dallas	30.00	32.00	1.05	1.21	1.37l	1.21	1.32	0.474	0.510r	66.59	80.00	0.16	0.2240
Denver	25.00	25.00	1.50	1.40	1.50	1.40	1.55	0.462	10.37	66.30gg	75.05gg	0.1825	25.46
Detroit	25.00	25.00	1.28	1.32	1.41	1.45	1.45	0.456a	10.376a	65.15a	73.90a	13.75f	24.50f
Kansas City	30.00	35.00	1.14	1.18	1.26l	1.18	....	0.444	11.40	67.50	76.25	16.08f	22.44f
Los Angeles	26.00	27.00	1.25k	1.20k	1.25	1.00	1.10	0.506	10.543d	67.10	75.85	0.1608	0.2244
Minneapolis	33.00	33.00	1.55	1.60	1.80	1.40	1.40	0.503	15.15w	65.71	72.21ff	0.15.62f	0.21.76
Montreal	27.60h	35.60h	1.20	1.40	1.50	1.15e	1.15e	0.437	9.92	66.50	.....	0.1827	0.2160
New Orleans	32.00	45.00	1.25	1.25	1.25	1.25	1.25	0.444	8.786	68.00	76.00	0.1608	0.2244
New York	24.20	30.20	1.35	1.30	1.50	1.40	1.40	0.506a	10.14ad	68.58	77.33	16.08f	22.44f
Philadelphia	23/25	32.00	1.35	1.35	1.40l	1.05	1.05	0.44av	9.46a	66/68a	75/77a	20.00f	28.75f
Pittsburgh	28.00nn	28.00nn	1.60nn	1.50nn	1.35	1.65	1.65	0.456	9.83	64.00	72.75pp	0.1419	0.1980
St. Louis	29.00	40.00	1.35	1.60jj	1.55	1.60	1.60	0.456	10.37	68.11	74.61y	16.08fm	22.44fm
San Francisco	27.85	32.00	1.20	1.20	1.30	1.20	1.30	0.505	9.13	65.20	73.75	0.1608	.2244
Seattle	41.00	44.00	1.55	1.25k	1.85l	1.50k	....	0.506	9.964	67.08	88.08	0.1608	0.2244
Toronto	28.00	45.50	1.20	1.30	1.45l	....	1.55	0.4095	24.00ae	73.74	86.52	0.2562	0.3029p

‡trucklots, delivered †fob warehouse *fob city *a delivered *b½" O.D. *c ⅝" O.D. *d 0.100"th *e 34" x 60" sheet *f per 100 ft *g 5 tons & up; cold roll, anneal & pickled; 2B finish *h Incl. Federal tax *i 1100 & 3003 alloy, mill finish *k bag of 3 cu ft *l treated with air entraining agent *m 2-10M ft *n frcb mill, fr allow *p 100 sq ft *r per lb. *s 30 lb bag *t 36" x 96:-10.81 lb/sh; 48" x 144":-21.7 lb/sh *u 19.31 lb/sh *v fob plant *w 48" x 144" *x 100th *y 27 gauge *aa 16M lb & up *dd add $1.00 cwtfboxing *ee 4 tons & up *ff 26 ga *gg add $2 'cwt boxing; $0.75/cwt on skids *hh Theoretical wt for 48" × 96": 80.4-lb, per sh. *ii 300-bag lots *jj 100-lb bag *mm Theoretical wt: 19.7-lb per sh. *nn 2% cash *oo skid packed *pp type 304

2800′ cycles in less than 4 minutes...

on Amarillo park project

Fast-stepping D Tournapull is push-loaded with 6 to 7 yards in 75 feet, often in as little as 30 seconds. Loading here was in hard-packed clay; on other side of basin in sandy loam.

"D's" high apron lift and positive ejection tailgate are both electrically controlled . . . get load out fast. Spread time here averaged only 17 seconds. 1325′ return trip, including rough grading of dam, averaged less than 1½ minutes.

Improving city-owned Thompson Park, Amarillo, Texas, meant a variety of jobs. Two new dams were needed to check run-off water and trap silt from a water basin, and prevent flash floods. An existing dam needed rebuilding. Also scheduled were construction of roads, a miniature railroad, and "general" improvements.

Contractors Threet & Bumpus, Amarillo, decided that two new 138 hp LeTourneau-Westinghouse Tournapulls would provide lowest-cost dirtmoving for the many different assignments of the project. The performance of their modern, 9-yd. "D's" at Thompson Park convinced them that the versatile, 29.5 mph "D" is a go-anywhere dirtmover . . . one that builds profits on a wide range of jobs.

Big loads . . . fast cycles

Fast-moving "D's" hauled dirt to build up a dam, packing big 6 and 7-yard payloads. On return trips, 'Pulls helped level dam top by dragging scraper blade. Yet, 2800′ cycles were clicked off in less than 4 minutes.

Co-owner Don Threet, like so many contractors across the nation, is well pleased with the work record of his D 'Pulls. Feature he likes best is exclusive, LeTourneau-Westinghouse power-transfer differential. As he puts it: "When one drive-wheel spins, the other pulls harder." Mr. Threet says this feature was one of the firm's main reasons for buying D Tournapulls.

"Loads better . . . easier"

Operator K. D. Coon says D Tournapull® "loads better and easier, and the dirt stays in the scraper." Fellow operator Johnny Broaddus calls it "the easiest machine I've ever operated."

All-around utility tool

No doubt many of your jobs include scattered, odd-lot dirtmoving. The "Handyman D" — flexible, speedy, and mobile — handles such jobs faster and more efficiently than most larger scrapers. This 9-yd. dirtmover grades, backfills (with optional dozer blade), strips, backslopes, ditches, stockpiles, levels, spreads, and does many general construction and maintenance tasks, at lowest-net-cost-per-yard.

Ask for full facts on how *minimum-investment, maximum-return* D Tournapull can increase your profits.

DP-1430-DC-1

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- Clay Products, Lime, Plaster, Paint, Roofing: Last, Jan. 30; Next, Feb. 27

BUILDING BOARD & LATH AND INSULATION—DELIVERED TRUCKLOAD LOTS

	GYPSUM PLASTER BOARD tapered edge per Msq ft ⅜"	½"	GYPSUM BOARD LATH plain or perf per Msq ft ⅜" x 16" x 48"	GYPSUM SHEATHING tongue & groove per Msq ft ½" x 2' x 8'	FIBER BOARD SHEATHING asph impreg & coat per Msq ft ½" sq ed	½" T&G	FIBER BOARD INSULATION sq edge, paint per Msq ft ½"	MINERAL WOOL INSULATION loose, per 40-lb bag a	3" batts per M sf	GLASS FIBER INSULATION loose, per 40-lb bag a	3" batts per M sf	ALUMINUM FOIL 60¢ Kraft 1 side foil per roll of 250 s. f.	Expansible Blanket 2 layers foil per Msq. ft
Atlanta	$70.00	$60.00	$43.50	$70.00	$70.00	$127.00	$70.00	$1.00	$60.00	$2.00[b]	$75.00	.....	.....
Baltimore	51.25[f]	44.75[f]	32.55[f]	55.00[f]	65.00[f]	108.50[f]	69.00[f]	1.30	66.50	1.50	45.00	$4.00[g]	$33.50
Birmingham	73.00	60.00	47.77	75.00	65.00	136.50	81.00	1.40	70.00	1.60	75.00	3.30[g]	.....
Boston	60.00[m]	50.00[m]	36.00[m]	60.00[m]	65.00[m]	120.00[m]	79.00[kn]	1.45	75.00	.....	65.00	5.30	52.50
Chicago	67.00	52.00	43.00	62.00	85.00	123.00	85.00	1.85	80.00[k]	.....	63/65[t]	5.25[g]	..... [t]
Cincinnati	48.00[w]	42.85[w]	32.05[w]	51.16[w]	70.00[w]	125.00[w]	72.50[w]	1.30	63.00	1.30	76.50	3.12[j]	50.00
Cleveland	60.50	55.00	40.00	65.00	74.00	130.00	80.00	1.35/1.50	80.00	.....	55.00*	20.00[e]	60.00
Dallas	55.00	52.50	42.50	60.00	68.50	117.50	68.50	1.94	66.70	1.40	66.10	4.30[g]	.....
Denver	62.00	54.50	41.00	62.00	75.90	126.00	74.90	.....	71.00[u]	1.30[v]	60.00[u]	11.00[r]	21.00
Detroit	57.50	49.50	36.00	61.00	59.50	90.00	59.00	.....	.....	1.95[b]	88.00	.....	.....
Kansas City	65.00	55.00	40.00	.....	72.00	115.00	75.00	1.40	75.00	2.00	75.00	4.11[d]	.....[dy]
Los Angeles	64.00	59.00	0.325[z]	63.50	75.00	125.00	80.00	.....	83.00	1.35[s]	64.00	4.40[g]	.....
Minneapolis	75.00	65.00	0.40[z]	80.00	78.00	140.00	78.00	2.00	80.00	1.80	80.00	5.50	.....
Montreal	56.00	47.40	36/39	53.00	63.25	.....	63.00	1.50	66.00	1.50	66.00	9.00[q]	56.00
New Orleans	57.00	48.00	46.00	60.00	75.00	135.00	72.50	1.75	65.00*	.....	.....	.....	.....
New York	53.25	45.75	35.25	54.25	71.00	117.00	72.50	1.55[b]	68.50	1.55[b]	68.50	4.38[i]	52.50[c]
Philadelphia	50/55	48/53	34/40	49/54	68/73	105/110	55/65	.....	60/70	.....	70/75	5.60/6.34	40/50
Pittsburgh	59.00	47.00	35.00	.....	60.00	100.00	55.00	1.05[s]	55.00[s]	1.05[s]	55.00[s]	2.75[i]	38.50
St. Louis	65.00	55.00	39.00	70.00	75.00	120.00	80.00	1.35	85.00	1.65	20.00	4.38[i]	.....
San Francisco	55.00	46.50	0.35[z]	58.00	68.00	109.00	67.00	1.60	66.50	1.60	66.50	4.95	55.00
Seattle	66.00	56.90	49.95	65.00	74.50	125.00	73.50	1.60[r]	74.00	1.90*[p]	80.00*[l]	4.25	46.80
Toronto	61.00	50.00	38.00	64.50	75.00	.....	.....	1.40	60.00	.....	80.00	18.50[e]	44.95

*a Semi thick. [b] 30# bag. [c] 12' to 24' width. [d] 40# kraft paper, 5 Msf, 100/500 rolls. [e] 20# sq ft bag, 4" thick. [f] Full trailer loads. [g] 80# kraft paper backing. [h] LCL. [i] 40#. [j] 80#. [l] 2". [m] 10 ton quantities. [n] Distributor's siding. [o] Per Msf roll. [p] 32# bag. [q] 500 sf. [r] Per cwt. [s] 35# bag. [t] 26# bag. [u] Flame proof $75. [w] F.o.b. city. [x] Sq yd. [y] Temporarily off market

HOURLY WAGE RATES—Base rate + fringe benefits

	Bricklayers	Carpenters	Struct. Iron Workers	Hoisting Engineers	Plasterers	Electrical Workers	Steamfitters	Common Labor Building	Common Labor Heavy Cons
Atlanta	$3.60	$2.95	$3.15+7½[d]	$3.225	$3.125	$3.30+7[e]	$3.30+25[d]	$1.60	$1.60
Baltimore	3.80+10½[d]	3.05+7½[d]	3.75+7½[d]	3.55/3.70+10[eQ]	3.35+7½[d]	3.425+7½[di]	3.30+7½[d]	1.90+7½[d]	1.90+7½[d]
Birmingham	3.65	2.85	3.25+10[e]	2.65[s]	3.05	3.425	3.32+10[e]	1.65	1.75
Boston	3.65+15[d]	3.25+10[d]	3.70+20[s]	3.65+10[d]	3.65+20¢	3.55+12[s]	3.20+10[d]	2.45+7[d]	2.35+7[d]
Chicago	3.82½+7½[e]	3.45+20[e]	3.80+15[e]	3.40+5[e]	3.70+23[e]	3.65+22[e]	3.55+22[eoo]	2.77½+7½[e]	2.77½+7½[e]
Cincinnati	3.75	3.45	3.50+7½[d]	3.225/3.475	3.50	3.67+4[eN]	3.65+9½[e]	2.50	2.40
Cleveland	3.715+10[e]	3.74	3.64+10[e]	3.74	3.74	3.765	3.64+10[d]	3.00	2.915
Dallas	3.775	3.10	3.175+7½[e]	3.20	3.561¼+10[e]	3.25+7½[e]	3.25+8½[e]	1.62½	1.62½
Denver	3.75	3.20	3.125+7½[ed]	2.95	3.375+12½[eM]	3.40[f]	3.40+15[eD]	2.10	2.10
Detroit	3.53+38[eH]	3.25+40[e]	3.60+22½[eP]	3.20+20[e†]	3.58+34[e]	3.65+34½[e]	3.63+14[eB]	2.58+25[e]	2.58+25[e]
Kansas City	3.75	3.125	3.25	3.22	3.50	3.475[O]	3.40+9¢[W]	2.255	2.305
Los Angeles	3.80+10[e†b]	3.22½+20[ed]	3.625+10[e]	3.19+10[ed]	3.94+15[ed]	3.90[f]	3.70+28½[e]	2.50+7½[e]	2.50+7½[e]
Minneapolis	3.575	3.15	3.32	3.10	3.25+23[eG]	3.25+36[e]	3.215+20[e]	2.40	2.55
New Orleans	3.425+5[e]	2.90	3.20+7½[e]	3.025+7½[e]	2.985+5[e]	3.275+7½[e]	3.25+15[e]	1.65	1.65
New York	4.25+37[e†r]	4.00+32[e†J]	4.30+36[e]	4.25+34[e†]	4.15+52[e]	3.65+45[e†F]	4.20+42[e†L]	2.90+23 2¢[F]	2.90+23 2¢[F]
Philadelphia	3.75+17[e]	3.535	4.05+18¢[M]	3.20½/3.95½+10[e]	3.90+15[e]	4.07½+16[e]	4.00+16[e]	2.25	2.55
Pittsburgh	3.95+17½[e]	3.525+7½[e]	3.80+10[ed]	3.64+10[ed]	3.575+17½[e]	4.00+28[ed]	3.775+17½[e]	2.325+17½[e]	2.30+20¢[ff]
St. Louis R	3.75+2h½[e]	3.45+10[e]	3.475+7½[e]	3.55[r]	3.80+7½[e]	3.83+20¢	3.80+20[e]	2.50+10[e]	2.50+10[e]
San Francisco	3.95+52½[edd]	3.175+30[ef]	3.62½+10[e]	3.205+10[e]	3.69+30[ee]	3.785+26[ef]	3.70+46[eK]	2.505+10[e]	2.505+10[e]
Seattle	3.75+10[ed]	3.13+10[ed]	3.40+10[ed]	3.29+20[ee]	3.40+10[ed]	3.40+21½[eX]	3.62+23[eF]	2.70+10[ed]	2.70+10[ed]
Montreal	2.20+5[e†]	2.00+4[e†]	2.15+5[e†]	1.90+4[e†]	2.22+5[e†]	2.20+5[e†]	2.20+5[e†]	1.40+3[e†]	1.40+3[e†]
Toronto	2.76+11[ef]	2.50+10[ef]	2.55+7½[ef]	2.60+10[ef]	2.60+20[ecf]	2.80+11[ef]	2.69+17[ecf]	1.55+6[ef]	1.55+6[ef]

ENR Skilled Average (Bricklayers, Carpenters, Iron workers): $3.626. ENR Common Average $2.373.
*R revised, Boston steamfitters; St. Louis bricklayers

	Truck drivers 1½ T	under 4 cy	over 4 cy	Tractor Operators Incl. bulldozers 34–49 hp	70–100 hp	100 & over	Tractor scraper 15–16 cy	Power cranes & shovels ½ cy	¾ cy	Motor grader oper	Air comp oper	Air tool oper
Atlanta	$1.70	$1.80	$2.05	$2.70	$2.70	$2.70	$2.70	$3.225	$3.225	$2.70	$2.475	$1.77
Baltimore R	1.90+7½[e]	1.90+7½[e]	2.00+7½[ehh]	3.15/3.30 +10[eh]	3.15/3.30 +10[eh]	3.15/3.30 +10[eh]	3.15/3.30 +10[eh]	3.55/3.70 +10[eh]	3.55/3.70 +10[eh]	3.15/3.30 +10[eh]	2.85/3.00 +10[eh]	2.00+7½[e]
Birmingham	1.73	1.92[ff]	2.25[ee]	2.79	2.79	2.79	2.93	2.93	2.93	2.89	2.52	1.90
Boston	2.39[c]	.....[c]	.....[c]	3.275+10[ead]	3.275+10[ead]	3.275+10[ead]	3.275+10[ead]	3.65+10[e]	3.65+10[e]	3.275+10[e]	3.20+10[e]	2.60+7[eee]
Chicago	2.26+12[ef]	.....	.....	3.15+5[e]	3.30+5[e]	3.20+5[e]	3.00+5[e]	3.75+5[e]	3.75+5[e]	3.25+5[e]	3.10+5[e]	.....
Cincinnati	2.33[ee]	2.43[ee]	2.53[ee]	3.225	3.225	3.225	3.225	3.475	3.475	3.475	3.475	3.475
Cleveland	2.625+10[e]	2.625+10[e]	2.625+10[e]	3.49	3.49	3.49	3.49	3.74	3.74	3.49	3.365	3.365
Dallas	1.625	1.625	1.625/2.625[f]	1.625/2.625[f]	1.625/2.625[f]	1.625/2.625[f]	1.625/2.625[f]	1.625/2.625[f]	1.625/2.625[f]	1.625/2.625[f]	1.625/2.625[f]	1.775/2.00[f]
Denver	2.20	2.30	2.45	2.20	2.80	2.80	2.80	2.95	2.95	2.80	2.80	2.40
Detroit	2.61	2.61	2.61	3.50+10[e]	3.50+10[e]	3.50+10[e]	3.50+10[e]	3.50+10[e]	3.50+10[e]	3.50+10[e]	3.225+10[e]	2.71+25[eee]
Kansas City	2.23[m]	2.23[o]	2.305[o]	2.425	2.975[o]	2.975[o]	2.975[o]	3.22	3.22	2.935	2.975[r]	2.35
Los Angeles	2.63+10[e]	2.63+10[e]	2.83+10[e]	3.47+10[e]	3.47+10[e]	3.47+10[e]	3.56+10[e]	3.56+10[e]	3.56+10[e]	3.56+10[e]	2.74+10[e]	2.71+7½[e]
Minneapolis	2.40	2.40[e]	2.55[i]	2.93	3.15[e]		3.15	3.37[e]	3.63[e]	2.93	2.82	2.53
New Orleans	1.80	2.05	2.05	2.375+8[e]	3.025+7½[e]	3.025+7½[e]	3.025+7½[e]	3.025+7½[e]	3.025+7½[e]	3.025+7½[e]	2.375+7½[e]	1.75
New York	2.21+22½[ee]	2.75+14[ehh]	2.75+14[ehh]	3.625+29[eh]	3.625+29[eh]	3.625+29[eh]	3.75+30[eh]	4.50+36[eh]	4.50+36[eh]	3.75+30[eh]	3.75+30[ehi]	3.35+27[eee]
Philadelphia	—2.215/2.35+12½[e]—			—3.20½/3.95½+10[e]—			3.20½/3.95½ +10[e]	—3.20½/3.95½+10[e]—		3.20½/3.95½ +10[e]	3.20+10[e]	2.25+10[e]
Pittsburgh	2.37+20[e]	2.51+20[em]	2.61+20[em]	3.44+10[e]	3.44+10[e]	3.44+10[e]	3.44+10[e]	3.64+10[e]	3.64+10[e]	3.64+10[e]	3.15+10[e]	2.30+20[em]
St. Louis R	2.575+7½[eo]	2.65+7½[e]	2.65+7½[e]	3.55[eh]	3.55[eh]	3.55[eh]	3.55[eh]	3.55[eh]	3.55[eh]	3.55[eh]	3.00[ehk]	3.00[ehk]
San Francisco	2.55+10[e]	2.55+10[e]	2.69+10[e]	3.32+10[e]	3.32+10[e]	3.32+10[e]	3.32+10[e]	3.65+10[e]	3.65+10[e]	3.48+10[e]	2.93+10[e]	2.755+10[e]
Seattle	2.87+17½[eee]	2.87+17½[eddz]	3.07+17½[eeee]	3.26+20[eff]	3.26+20[eff]	3.26+20[eff]	3.26+20[eff]	3.63+20[eff]	3.63+20[eff]	3.35+20[eff]	2.99+20[eff]	2.90+10[e]
Montreal	1.40+3[ef]	1.40+3[ef]	1.40+3[ef]	1.60+4[ef]	1.83+4[ef]	1.83+4[ef]	1.83+4[ef]	2.09+5[ef]	2.09+5[ef]	1.83+4[ef]	1.70+4[ef]	1.70+4[ef]
Toronto	1.60+6[ef]	1.60+6[ef]	1.60+6[ef]	2.00+8[ef]	2.10+8[ef]	2.10+8[ef]	2.10+8[ef]	2.60+10[ef]	2.60+10[ef]	2.10+8[ef]	2.15+9[ef]	2.15+9[ef]

*a H & WF. [b] lower rates, straight time; other broken. [c] 2-axle; 10 wh. 3 axle $2.45; Euclid $2.65. [d] intermediate. [e] bldg contr.; highway $2.43+7¢ WF. [f] less than 2-T. [g] up 6 cy. [h] 4% WF, 4% PF. [i] 6-8 cy. [j] plus $2 pd by employer for hosp. death benefits to family. [k] bldg constr; steel contr $3.475. [l] higher rates are union, other taken from min. wage approved by County Comm. Court. [m] 10¢ H & W, 5¢ PF. [n] flatbed. [o] under 10 cy. [p] over 10 cy. [q] over 50 hp. [r] blade grader. [s] WF. [t] single. [u] incl. 10¢ H & W. [w] 7½¢ H & W. 5¢ PF. [x] 7½¢ WF, 10¢ PF. [y] to 3½ cy. [z] 3½ cy & over. [aa] plus W & PF. [bb] 3% WF, 2% PF; plus 11 PH. [cc] 11¢ WF, 11½¢ PF, 11 PH. [dd] up to 5 cy. [ee] 5 cy & over. [ff] 1½ to 3 T. [gg] up to 5 T; 5 T & over, 2.25. [hh] 5¢ H & WF, 2½¢ PF. [ii] 4% WF. [kk] Incl. 10¢ WF. [ll] Revised, Effective Mar. 1, 1957 incl. 2% VF [mm] 10¢ H & WF, 10¢ ins. 5¢ VP. [oo] Plus $2.25 wk. WF. [ss] 5% WF, plus 6 PH. [tt] 10¢ H & WF, 10¢ PF. *R: revised, Baltimore air comp., St. Louis truck drivers 1½T

MEXICO CITY PRICES

Pesos, F.o.b. City		Dec. '57	Jan. '58
Common Wages—Building (8 hr. day) (Peons)	av. per hr.	1.50	1.50
Common Wages—Heavy Const. (8 hr. day) (Peons)	av. per hr.	1.86	1.86
Skilled Labor Wages			
Carpenters (8 hr. day) 1 el.	av. per hr.	3.10	3.10
Bricklayers (8 hr. day) 1 el.	av. per hr.	2.50	2.50
Struct. Iron Workers (8 hr. day) ..... Remachadores.	av. per hr.	3.77	3.77

Struct. Steel, Shapes		Dec. '57	Jan. '58
3"-15" x 12 meters ..... per metric ton		2300.00#	2300.00#
# fob Monterrey			
Reinf. Steel, Corrugated Rods			
⅜" x 11 meters	per ton	2000.00	2000.00
½" x 11 meters	per ton	2000.00	2000.00
⅝" x 11 meters	per ton	2000.00	2000.00
¾" x 11 meters	per ton	2000.00	2000.00
⅞" x 11 meters	per ton	2000.00	2000.00
1" x 11 meters	per ton	2000.00	2000.00

Gravel truck load at 3½ cu. meters		Dec. '57	Jan. '58
Blue Gravel	per tr. load	75.00	75.00
Rose Gravel	per tr. load	65.00	65.00
Cement, Std. Port. (Tolteca)	per tan	240.00	240.00
Lumber			
1" Pine	per M ft.	1700.00	1700.00
1½" Pine	per M ft.	1900.00	1900.00

* Cost of living bonus incl. in base pay. † 2% VF
*a 8 hr. day. *b 7 hr. day. *c 5% vac. stamp fund plus 10¢ WF for bricklayers; 4% VF for electricians plus 8¢ WF, 1% PF. *d H & WF. *e 10¢ H & W, 10¢ VF. *f 10¢ H & W, 10¢ PF, 10¢ VF. *h $2.85 homes & housing plus 7½¢ WF. *i WF. *j Inc. 4% VF; 1% PF pd by employer. *k 10¢ WF, 5¢ VP, 5¢ HP. *l 4% VF. *m 7½¢ WF, 10¢ PF. *n 7% V & Hol. 3% H & W, 1% PF. *o 10¢ WF, 10¢ PF. *p 3% WF, 3% PF + 10¢ in lieu of pd. hol. *q 10¢ WF, 6% V & H, 3% PF. *r 4% WF, 20¢ PF. *s 5% W & PF, 4% VF, 1% NC, 1% JI, plus 6 PH. *t Inc. 10¢ WF. *u 10¢ WF, 1% PF, 1% apprent. *v 1 drum; 2 drums, 2.80. *w 15¢ WF, 15¢ VF. *x 2% VF. *y 10¢ H & W, 10¢ PF. *z 10¢ WF, 5¢ HP. *A 15¢ WF, 15¢ PF, 20¢ BF. *B 7½¢ VP, 5¢ PF, 1½¢ Ed. F. *C 9¢ H & W & Ins., 7% V & H. *D 10¢ H & WF, 5¢ indus. prom. *E 8% WF, plus travel pay per day. *F Plus $4 per day annuity contrib. *G 10¢ WF, 10¢ VF, 3¢ prom. *H 10¢ WF, 10¢ VP, 3% PF, 2% PH. *I 15¢ H & WF, 5¢ advtg. *J 8% WF, 6 PH, 3% PF. *K 25¢ W & PF, 15¢ VF, plus 6¢ misc. *L 3% WF, 3% PF, 3% VF, 1% Ed. F. *M 10½¢ WF, 7½¢ PF. *N 1% PF. *O 10¢ WF, 1% NECA. *P 10¢ H Ins., 7½¢ PF, 5¢ VF. *Q 2 drums; 1 drum $2.85/3.00 + 10¢ WF *R 10¢ H & WF, 2¢ admin. 1¢ apprent. *S 10¢ H & WF, 15¢ PF. *T H & W, VF. *U 10¢ WF, 13¢ VF, 3¢ PF. *V 4% WF, 4% PF. *W 7½¢ WF, 1½¢ Ed. F. *X 7½¢ WF, 14¢ VF. *aa 7¢ WF, 15¢ PF. *bb 8¢ WF, 2¢ advg. *dd 17½¢ WF, 20¢ PF, 10¢ PH, 5¢ Jt Bd. *ff 10¢ H & W, 5¢ PF. *gg 10¢ ins. *hh 7½¢ H & WF, 5¢ indus. prom. *ii 4% WF, 4% PF, 6 PH. *jj 2%VF

PIONEERS ROADWAYS

STRIPS BLACKTOP

How you can speed dozing jobs ...cut non-productive costs

To get a work combination that's ready for profitable *action* anywhere ... anytime ... check the 210 hp LeTourneau-Westinghouse Tournatractor®. This rubber-tired tractor can drive job-to-job at a moment's notice. Operator just flips instant-shift lever and he's on his way — over highways or cross-country. Big, low-pressure tires do no damage to pavement, bridges, or RR tracks.

Handles wide variety of jobs

Equipped with bulldozer or Angledozer® blade, versatile Tournatractor does pioneering, ditching, backsloping ... levels and maintains dumps and fills ... strips blacktop ... speeds through dozens of other clean-up and maintenance jobs. Also, Tournatractor's power and maneuverability make it an excellent pusher. And it can be used effectively as a pull-type scraper prime-mover. Use its speed and maneuverability, also, to pull Rooters, Sheep's Foot rollers, and other heavy equipment.

Simple, safe operation

With electric push-button controls grouped handily in front of operator, he can keep his eyes on the ground. And, sitting up front, operator can see where he's going, what he's doing — for sure, safe control at all times. Big, heavy-duty air brakes on all four wheels provide 940 square inches of braking surface on each wheel. That's more braking surface *per wheel* than most comparable units have *on the entire machine*. Operator can effectively use all of Tournatractor's speed and mobility with confidence and safety.

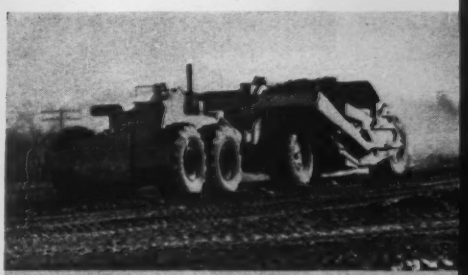
Costs less to maintain

With enclosed anti-friction drive and fewer moving parts, Tournatractor is better protected from wear — will give you higher efficiency through many more hard-working hours of continuous service.

Tournatractor has only 4 rubber-tired wheels compared to about 562 crawler track parts. In many materials, tires outwear tracks by as much as 2-to-1. In highly abrasive materials, tires give as much as 4 times more service than tracks. Also, with extensive oil enclosures, plus anti-friction bearings throughout, maintenance time is much less.

See Tournatractor in action

Why not investigate "work-and-run" Tournatractor's effectiveness for your projects? You'll be amazed at the speed and efficiency in which this rubber-tired tractor can handle scattered dozing and pusher assignments. We'll be glad to arrange a demonstration. Call or write for complete details. CT-1494-DC-1



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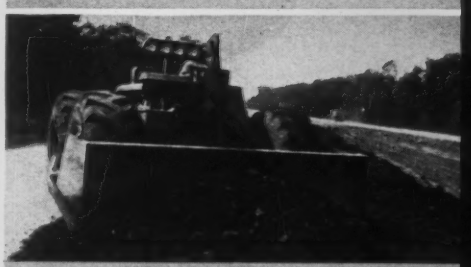


MAKES EMERGENCY ROAD REPAIRS

DRIVES JOB-TO-JOB

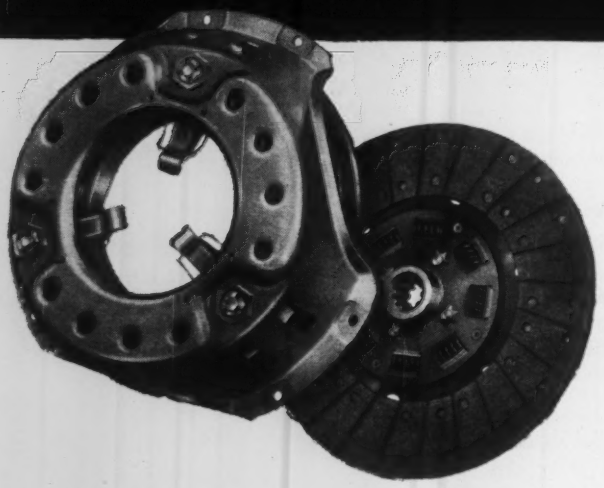
LeTOURNEAU-WESTINGHOUSE COMPANY, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

Where quality is a habit

Now, a LIPE 12"

heavy-duty Direct Pressure Clutch



FIRST in the entirely new Lipe DPB Line...

featuring:

- **Maximum mechanical efficiency!**
- **Optional needle-bearing linkage!**
- **Stronger, lighter stamped cover!**
- **Full ventilation for cooler running!**
- **Fade-resisting chrome silicon springs!**
- **Spring heat-insulating washers!**
- **Lower pedal load!**
- **Competitive price!**

Here's the first in a *new* series of Lipe direct pressure clutches to supplement the already-famous DP Line! With the introduction of the new 12" DPB single and two plate, Lipe direct pressure clutches are available for all applications involving gross vehicle weights of 19,000 lbs. and up. Additional DPB models in 13" through 15" single and two plate sizes will be available soon.

The new Lipe 12" DPB clutch is interchangeable with many other models and is easily adapted to any present vehicle requirements. Improved design, a simpler, sturdier internal lever system, and Lipe's precision manufacturing and testing assure you extra clutch mileage in your vehicles. For a complete, first-hand story about the Lipe 12" DPB and the entirely new DPB Clutch line, see the authorized Lipe distributor located near you.

LIPE ROLLWAY

Lipe-ROLLWAY
CORPORATION
SYRACUSE 1, N. Y.

Bids Asked—Low Bidders—Contracts Awarded—

Compiled by Business News Department—Engineering News-Record, 330 W. 42nd St., New York 36, N. Y., ELSIE EAVES, Manager
J. A. MAHONEY, M. WETZEL, M. E. SCIORRA, D. TARTAGLIA, Reports
J. H. WEBBER, M. R. ROESSLER, E. R. HUBER, Statistics.

NEW ENGLAND

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
STREETS AND ROADS

February 3 Connecticut — February 4 Massachusetts

▲† **Massachusetts**—SPECIAL AAA FACILITIES—BA 2/9—U. S. Eng., 150 Causeway St., Boston, addn., alterations for Special AAA Facilities, Nike Batteries Q3-05-15-17-36-37-38-40-5563-73-84-85, Boston Defense Area, Reading, Danvers Beverly, Nahant, Hog Island, Squantum, Cohasset, Blue Hills, Needham, Lincoln, Burlington and Bedford, ENG-19-016-58-59, $2,300,000. Crandall Engineering Co., 260 Franklin St., Boston, engr.

BUILDINGS—BA

▲† **Mass., Bedford**—HOUSING—BA On Or About 2/5—Contg. Officer, Air Force Cambridge Research Center, Laurence G. Hanscom Field, armed services housing, consisting 395 family housing units at Laurence G. Hanscom Field, Inv. Bids No. 19-604-58-62. Plans deposit $100. Bids Jan. 14 rejected as Inv. Bids 19-604-58-40. CD 1/17, under LB.

▲ **Mass., Amherst**—SCIENCE CENTER—BA 2/14—Commonwealth of Mass., University of Mass., c/o Div. Bldg. Constr., 38 Chauncy St., Boston, U 57-1, Science Center (second section), University of Mass. $2,000,153. Plans deposit $150. James H. Richie & Assoc., 135 Clarendon St., Boston, archts. CD 2/6/56.

BUILDINGS—LB & CA

† **Joseph Rugo, Inc.**, 581 Boylston St., Boston, Mass., CA $1,714,000, M-825 ADMISSIONS TREATMENT BLDG. for State Hospital, WESTBORO, MASS. Commonwealth of Mass., Dpt.. Mental Health, c/o Div. Bldg. Constr., 38 Chauncy St., Boston, Mass. Bids Jan. 10. CD 1/15, under LB.

▲ **Waterbury Housing Auth.**, 156 Harris Circle Waterbury, Conn., rejected bids Dec. 19, 150 unit moderate rental HOUSING, WATERBURY, CONN., LB $1,903,500. CD 1/3, under LB.

MIDDLE ATLANTIC

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
BRIDGES

February 11 New Jersey — February 20 New York
February 21 Pennsylvania
STREETS AND ROADS
February 5 Delaware — February 11 New Jersey
February 20 New York — February 21 Pennsylvania

▲ **N. J., Somerville**—BA 2/21—Somerset-Raritan Sewer Auth., Somerville, primary sewage treatment plant and collection sys. $3,000,000-$4,000,000. Extended date Whitman, Requardt & Assocs., 1304 St. Paul St., Baltimore, Md., engrs. CD 12/5.

▲ **D. C., Wash.**—BA 2/28—D. C. Govt., Sanitation Dpt., 499 Pennsylvania Ave., constr. 12 ft. diam. stormwater sewer, East Capitol St. between Burns St. and Texas Ave., approx. 3,177 lin. ft. 12 ft. diam. brick and rein. con. masonry in tunnel. Plans deposit $50; adv. ENR 1/30. CD 1/20.

HEAVY CONSTRUCTION—LB & CA

▲ **Merritt, Chapman & Scott Corp.**, 261 Madison Ave., New York, N. Y. CA $98,288,498 main power plant, Niagara Project, Lewiston near Niagara Falls, Contr. N-3, NEW YORK. The Power Authority of State of New York, The Coliseum Tower, 10 Columbus Circle, New York 19, N. Y. Bids Jan. 9, CD 1/10, under LB.

▲† **U. S. Eng.**, foot of Bridge St., Buffalo 7, N. Y., Own Forces, dredging South Cornwall Channel, St. Lawrence Seaway, St. Lawrence River, CIVENG-30-023-58-2, NEW YORK. Bids 10/22, rejected. CD 12/2, under LB.

▲ **PENNSYLVANIA**—Pa. Hy. & Bridge Auth., 506 North Office Bldg., Harrisburg.

Pa.—**J. Richard Nissley, Inc.**, Landisville, Pa., CA $1,762,619, 7,094 ft. aggreg. base with bit. surf. 24 ft. wide 1 plate girder bridge, one span concrete deck I-beam bridge, T. R. 504, Clinton and Muncy Creeks Twps., Lycoming Co.;

Pa.—**Herbert R. Imbt, Inc.**, Box 138, State College, Pa., CA $844,275. constr. 34,807 ft. crushed aggreg. base with bit. surf. variable in width 3 bridges, T. R. 6, Hamlin Twp. Mt. Jewett Boro, McKean Co. Bids Dec. 20, awarded Jan. 14. CD 12/24, under LB.

BUILDINGS—LB & CA

▲ **H.R.H. Constr. Corp.**, 16 W. 46th St., New York 19, N. Y. LB $8,278,000., (4 bidders) general contract, Senator Robert A. Taft HOMES (Proj. NYC-2-28) Section I, incl. Bldgs. 1 to 5 (inclusive) and Bldg. W. located in area bounded generally by E. 115 St., Madison Ave., E. 112 St. and 5 Ave., NEW YORK, N. Y. New York City Housing Auth., 299 Broadway, New York, Zone 7, N. Y. Bids Jan. 21. CD 1/8;
Harry Starkman & Bros., 348 Brook Ave., New York 54, N. Y. LB $708,800. (6 bidders), heating and ventilating (New York, N. Y.);
E. A. Kahn & Co., Inc., 163-18 Jamaica Ave., Jamaica, N. Y. LB $650,000. (8 bidders), electrical work, (New York, N. Y.);
Lipsky & Rosenthal, Inc., Lexington Ave. and 115th St., New York 29, N. Y. LB $789,797. (9 bidders), plumbing (New York, N. Y.);
Watson Elevator Co., 342 W. 40th St., New York 36, N. Y. LB $345,855. (6 bidders), elevators (New York, N. Y.).

▲ **Kolyer Constr. Co.**, 111 E. 38 St., New York, N. Y., CA Est. $3,000,000. 21 story APARTMENT, Hillside Ave., NEW YORK, N. Y.. Inwood Terrace, Inc., c/o Brown & Guenther, archts., 1860 Broadway, New York, N. Y. Kokkins & Lyras, Associated, 111 E. 38 St., New York, N. Y. archts. CD 10/25.

▲ **Gerace & Castagna, Inc.**, 2110 A Northern Blvd., Manhasset, N. Y., CA $2,295,569. 3 story HOSPITAL, Beach 51 St. and Rockaway Beach Blvd., ROCKAWAY BEACH, N. Y. Rockaway Beach Hospital, Beach 85 St., Rockaway Beach, N. Y. Bids Dec. 20. CD 12/26, under LB.

▲ **Arthur Venneri Co.**, 300 North Ave. E, Westfield, N. J., CA $1,903,262, two 7 story APARTMENTS, Hudson Blvd., West 2 and 3 Sts., BAYONNE, N. J. Bayonne Housing Auth., 41 E. 25 St., Bayonne, N. J. CD 9/19/56.

▲ **Mahony-Troast Constr. Co.**, 790 Bloomfield Ave., Clifton, N. J., CA EST. $1,500,000. SHOPPING CENTER Linwood Ave. and Rte. 17, PARAMUS, N. J. Grand Union Co., 100 Broadway, East Paterson, N. J. CD 9/4.

▲ **Potteiger Co. Inc.**, West Reading, Pa., CA $1,994,338. general contract JUNIOR-SENIOR HIGH SCHOOL, WEST LAWN, PA. Wilson Joint School Auth., West Lawn, Pa. Bids Nov. 21, awarded Jan. 15. CD 12/18, under LB.

▲ **M. W. Kellogg Co.**, 225 Broadway, New York 7, N. Y., CA Est. $31,000,000, 16,500 ton Electrolytic Copper REFINERY, near BALTIMORE, MD. Kennecutt Copper Corp., 161 E. 42nd St., New York 17, N. Y. CD 10/22.

▲† **Five Boro Constr. Co.**, 2 Lafayette St., New York 7, N. Y., LB $3,077,000 (10 bidders), addns., alterations to BUILDINGS and utilities at Veterans Hospital, PERRY POINT, MD. Veterans Admin., Munitions Bldg., Wash., D. C. Bids Jan. 21. CD 11/21.

PROJECTS COVERED

By Size

Construction projects here reported cover the United States and Canada, are of these minimum sizes or larger: water supply, earthwork, waterways $44,000; other public works $73,000; industrial buildings $93,000; other buildings $344,000. Also Foreign projects of $100,000 and more in size of interest to American contractors.

By Regions & Classes of Construction

(In order of Listing)

BIDS ASKED
LOW BIDDERS
CONTRACTS AWARDED

New England — Middle West
Middle Atlantic — West of Mississippi
South — **Far West**

PROPOSED WORK
Water Supply — **Public Buildings**
Sewers, Waste Disposal — Mass Housing
Bridges — **Commercial Buildings**
Streets & Roads — **Industrial Buildings**
Earthwork, Waterways — **Unclassified**

In These Stages

PROPOSED WORK: Before and including appointment of engineers or architects.
BIDS ASKED: BA (new announcements only). For full calendar, see also preceding issues.
SOON LETS CONTRACT: SLC

LOW BIDDERS: LB On jobs below $500,000 in value all low bidder news will be the final reports published on the projects involved except where award is not made to the low bidder. In this case, a supplementary contract award report will be published.

CONTRACTS AWARDED: CA Except awards to low bidders previously reported in low bidder stage.

CD dates shown are of Construction Daily Issue in which last previous report was published.

OWNERS, ENGINEERS, ARCHITECTS, CONTRACTORS are invited to report their new jobs for listing in these reports when they meet or exceed the size minimums shown above. Address these news releases to J. A. Mahoney, REPORTS, ENGINEERING NEWS-RECORD, 330 W. 42 St., New York 36, N. Y.

Symbols and Abbreviations Include:

† Federal Government
▲ Project of $1,000,000 or over.
ENR Engineering News-Record
CD Construction Daily

For additional reports see Construction Daily.

SOUTH

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
BRIDGES
February 20 Kentucky
STREET AND ROADS
February 18 Florida — February 20 Kentucky

BUILDINGS—BA

▲ **La., Baton Rouge**—MOTEL, etc.—Bids Asked—Baton Rouge Investors, c/o Herbert Linic, Baton Rouge, or c/o Carlos B. Schoeppl, archt., 2701 Biscayne, Miami, Fla., motel, incl. swimming pool. $1,500,000. Geo. P. Rice, 400 Audubon, New Orleans, engr. CD 1/16.

HEAVY CONSTRUCTION—LB & CA

▲† **The Green Constr. Co.**, Oaktown, Ind., CA $1,696,000 (11 bidders) earth dams, spillway structures, access roads, an intake channel and reservoir clearing at The Savannah River Plant Aiken, Barnwell and Allendale Counties for U. S. Atomic Energy Comn., AIKEN, S. C. E. I. du Pont de Nemours Co., du Pont & Nemours Bldgs., Wilmington, Del. prime contractor. CD 11/30/50, under CA Public Bldgs.

▲† **Boyle Constr. Co.**, Sumter, S. C. LB $1,777,000, utilities and paving at Marine Corps Air Station NBy-4974, Spec. 4974/56, BEAUFORT, S. C. Dist. P. Wks. Office, Bldg. No. 13, Naval Base, Charleston, S. C. Bids Jan 15. CD 12/2.

▲ **GEORGIA**—State Hy. Dpt., No. 2, Capitol Sq., Atlanta,

Ga.—**W. L. Robinson Contr. Co.**, College Park, Ga., and **Southeastern Hy. Constr. Co.**, Gainesville, Ga., CA $2,532,309, grading, paving, 4 Hy. grade separations structures 7.23 mi. on what is locally known as Tifton-Cordele Rd., F-1-401-1 (10), Tift Co.;

Ga.—**Ledbetter Johnson Co.**, 401 E. 1st Ave., Rome, Ga., CA $1,519,133, 4 lane grading and paving, 1 double bridge 6.574 mi. on what is locally known as Rome-Cartersville Rd., State Rte. No. 20, F.-012-1(5), Floyd Co. Bids Nov. 15, awarded Jan. 7. CD 11/21, under LB.

BUILDINGS—LB & CA

▲ **Frank Messer & Sons, Inc.**, 4612 Paddock St., Cincinnati, O. CA $3,378,800. new WING to St. Mary's Hospital, HUNTINGTON, W. VA. Sister of The Pallotine Missionary Society, St. Mary's Hospital, Huntington, W. Va. Bids Dec. 17. CD 12/24, under LB.

▲ **J. M. Thompson**, 655 W. Lenoir St., Raleigh, N. C., LB $1,983,212, general contract 300 unit WALNUT TERRACE HOUSING, RALEIGH, N. C. City of Raleigh, Housing Auth., Halifax Court, Raleigh, N. C. Bids Jan. 14. CD 12/12;
W. R. Proctor, Rocky Mount, N. C., LB $357,445, plumbing for Walnut Housing, (Raleigh, N. C.).

▲ **Wm. A. Berbusse, Jr., Inc.**, 322 Royal Palm Way, Palm Beach, Fla., CA $3,346,000, COURT HOUSE and JAIL, south of present courthouse, Old County Courthouse, ORLANDO, FLA. Bd. Comrs. Orange Co., Court House, Orlando, Fla. Bids Dec. 20, CD 12/31 under LB.

▲ **E. I. duPont de Nemours Co.**, duPont Bldg., Wilmington, Del. Owner Builds. PLANT to mfg. dimethylterephthalate, OLD HICKORY, TENN. CD 2/13/53.

MIDDLE WEST

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
BRIDGES
February 4 Michigan
STREETS AND ROADS
February 4 Michigan

▲ **Tex., San Antonio**—BA 2/11—City Water Bd., 106 W. Market St., Contr. 8, constr. "Olmaso Basin" water pumping station. $2,500,000. Plans deposit $25. Black & Veatch, 1500 W. Meadow Lake Parkway, Box 8405, Kansas City, 14, Mo., engrs. CD 8/1.

▲† **Tex., Amarillo**—OPERATIONAL OFFICE—BA 3/5—U. S. Eng., Box 61, Tulsa, Okla., operational office for Strategic Air Command at Amarillo Air Force Base. $3,000,000.

▲ **O., Lorain**—HOUSING—BA 2/13—Lorain Metropolitan Housing Authority, 2153 Lorain Ave., 150 unit low rent housing Project No. OH 12-2. $2,000,000. Gar-

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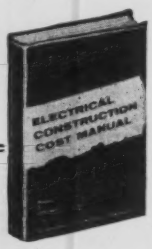

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field, Harris, Robinson & Schafer, 1740 E. 12th St., Cleveland, and Meyer & Fauver, Assoc. Archts., 945 Broadway, archts. CD 9/14/56.

BUILDINGS—SLC

▲ Ill., Elgin—PUBLISHING HOUSE, etc.—Brethern Publishing House, 24 S. State St., soon lets contract publishing house, office bldg., parking area, Dundee Ave. adj. to Trout Park, $1,500,000, Frazier & Raftery, 315 James, Geneva, archts., CD 1/26/56.

HEAVY CONSTRUCTION—LB & CA

▲ Acme Constr. Co., Box 257, Solon Village (Cleveland P. O.) O., CA $1,617,947 (12 bidders) bridge, AKRON, O. City, Leo G. Walter, Service Dir., City Hall, Akron, O. CD 12/11, under LB

▲ Friebel-Hartman Co., 59 Walnut St., Shelby, O., LB $3,827,804, est. $4,024,746, Contr. 3, sewage disposal plant, MANSFIELD, O. City, City Hall, Mansfield, O. Bids Jan. 16. CD 12/10.

▲ ILLINOIS—Illinois State Toll Highway Comn., 40 N. Wacker Dr., Chicago, rejected bids Jan. 14, Contr. MA-1 and MA-2, 8 maintenance buildings, 4 on Tri State Tollway, 3 on N. Ill. Tollway and 1 on E-W Tollway, Cook, Dupage Kane and Lake, Winnebago Counties, LB $2,798,909. Will re-advertise. CD 11/26.

BUILDINGS—LB & CA

▲ Albert M. Higley Co., 2036 E. 22nd St., Cleveland 15, O., CA Approx. $2,000,000 (5 bidders) conversion of Old Ohio Motors Bldg. into LABORATORY and CLASSROOM space, CLEVELAND, O. Fenn College, Euclid at 24th St., Cleveland 15, O. Awarded Jan. 15. Bids Jan. 10. CD 1/8.

▲ Sam Emerson Co., 1836 Euclid Ave., Cleveland, O., CA Est. $4,000,000, 9 story, 270,000 gross sq. ft. space H-shaped, Indiana limestone and buff brick exterior granite and metal trim OFFICE BLDG., fronting on E. Hardin and Beech Sts., FINDLAY, O. Ohio Oil Co., Donnell Bldg., Findlay, O. Wilbur Watson, 2930 Prospect Ave., Cleveland, O. archt. CD 3/10/53.

▲ George A. Fuller Co., 425 Park Ave., New York, N. Y., CA Est. $2,500,000 (4 bidders) 12 story, aluminum and glass exterior FIDELITY OFFICE BLDG. with parking in bsmnt. for 130 cars, 111 Monument Circle, INDIANAPOLIS, IND., Klein & Kuhn (realtors) Guaranty Bldg., Indianapolis, Ind., CD 6/4.

▲ S. N. Nielsen Co., 3059 N. Augusta Blvd., Chicago, Ill., CA $10,339,000, 6 APARTMENT BLDGS., 855 units, COMMUNITY CENTER BLDG., MANAGEMENT MAINT. BLDG., BOILER PLANT, Rockwell Gardens, bounded by Madison, Van Buren, Western and Rockwell Sts., CHICAGO, ILL. Chicago Housing Authority, 608 S. Dearborn St., Chicago, Ill. CD 12/10, under LB.

▲ R. E. Dailey & Co., 9900 Northlawn, Detroit, Mich., CA $1,800,000, OFFICE BLDG., Pallister and Second, DETROIT, MICH. International Business Machine Corp., 12727 West Warren, Dearborn, Mich.

▲ Christman Co., 408 N. Kalamazoo Plaza, Lansing, Mich., CA $1,981,675, Foote Memorial HOSPITAL addn., JACKSON, MICH. City, Bd. of Managers Foote Hospital, 205 North East Ave., Jackson, Mich. Bids Dec. 16. CD 11/20.

▲ Atom & Kin Building Co., 15339 McNichols, Detroit, Mich., Owner Builds, $1,700,000, 110 brick veneer HOMES, Gardner, Kenosha and Forest, SOUTHFIELD, MICH.

WEST OF MISSISSIPPI

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
BRIDGES

February 4 Iowa — February 6 Kansas
February 18, 19 Texas

STREETS AND ROADS

February 4 Iowa — February 6 Kansas
February 18 South Dakota — February 18, 19 Texas

▲† Kansas—BA 2/4—U. S. Eng., Federal Office Bldg., Kansas City 6, Mo., spillway at Tuttle Creek Dam and Reservoir on Big Blue River near Manhattan. ENG-23-028-58-25. $7,000,000. CD 12/19, under LB.

▲† N. M., Roswell—HOSPITAL—BA About 2/25—U. S. Eng., P. O. Box 1538, Albuquerque, 50 bed, air-conditioned hospital, Walker Air Force Base. $1,000,000-$5,000,000. CD 9/17.

▲† Kansas—BA On Or About 3/4—U. S. Eng., Federal Office Bldg., Kansas City 6, Mo., completion of embankment at Tuttle Creek Dam and Reservoir, near Manhattan, CIVENG-23-028-58-72. Plans deposit $11. CD 9/5.

BUILDINGS—BA

▲ Minn., Faribault—SCHOOL—BA 2/18—Bd. Educ., T. Paulus, clk., 2 story north wing Senior High School and 1 story, south wing, incl. 100x110 ft. gymnasium, etc. $1,500,000. Magney, Tusler & Setter, 303 Ronaoke Bldg., Minneapolis, archts. CD 3/27.

▲† Kan., Fort Leavenworth—HOSPITAL, etc.—BA On Or About 3/11—U. S. Eng., 1800 Federal Office Bldg., Kansas City 6, Mo., 3 story brick, masonry 90-bed hospital and 6,000 sq. ft. heating plant, ENG-23-028-58-25. Plans deposit $40. CD 2/21/56.

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BUILDINGS—SLC

▲ **Minn., Minneapolis**—OFFICE—Baker properties, Inc., Baker Bldg. and J. C. Penney Co., Inc., 2025 Nicollet Ave., soon lets contract remodel and reface exterior of existing bldg., Nicollet Ave. between Fifth and Sixth Sts. $1,500,000. Larson & McLaren, 1901 Foshay Tower, archts. CD 10/1.

BUILDINGS—LB & CA

▲† **H. K. Ferguson Co.**, 1783 E. 11, Cleveland, O. and **Macco Constr. Co.**, 14409 Paramount, Paramount, Calif., CA **$10,300,000**, 7th Section, HIGH ENERGY FUEL PLANT, incl. process units, steam boiler plant, engr. bldg., laboratory, etc. for Dpt. of Navy MUSKOGEE, OKLA. Callery Chemical Co., 230 N. Braddock St., Pittsburgh, Pa. Bids 12/23. Ralph M. Parsons Co., S. Olive St., Los Angeles, Calif., engr. CD 12/31, under LB.

▲† **Dicker, Frank & Assocs., Inc.**, 911 St. Joseph St., Dallas 10, Tex. CA **$7,635,000**, 500 unit CAPEHART HOUSING Project No. AF-74 FHA 115-81009 Air No. 8, FHA No. 115-81010 Air No. 9 and FHA No. 115-81011 Laughlin Air Force Base, DEL RIO, TEX. Procurement Office, Laughlin Air Force Base, Del Rio, Tex. Bids Nov. 26. CD 12/3, under LB.

▲ **Guido Bros. Constr. Co., Inc.**, Box 4326, Station A, San Antonio, Tex. LB **$1,533,000** Sam Houston HIGH SCHOOL, SAN ANTONIO, TEX. San Antonio Ind. School Dist., Lavaca and Matgorda Sts., San Antonio, Tex. Bids Jan. 14. CD 12/26.

FAR WEST

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
BRIDGES
February 20 California
STREETS AND ROADS
February 20, 27 California

BUILDINGS—BA

▲ **Calif., Los Angeles**—SCHOOL—BA 2/14—Los Angeles Bd. Educ., 1425 S. San Pedro St., Parkman Junior High School. $2,400,000. Extended date. A. C. Zimmerman, 2439 Hyperion Ave., archt. CD 1/13.

▲ **Utah, American Fork**—SCHOOL—BA 2/17—Alpine School Dist., Frank Jex, dir., American Fork, high school, 400 E. and Main St., Lehi. $1,500,000. Plans deposit $100. Wm. Rowe Smith, 1555 E. 3900 S. Salt Lake City, archt. CD 7/15/55.

▲ **Wash., Pullman**—PLANT SCIENCE—BA 3/28—Bd. Regents, Washington State College, Pullman, plant science bldg. $3,500,000. CD 1/9.

HEAVY CONSTRUCTION—LB & CA

▲† **R. A. Westbrook, Inc., Morrison-Knudsen, Inc., & H. Earl Parker, Inc.**, 6431 Elvas Ave., Sacramento, Calif. CA **$1,881,315**, operational apron extension and hydrant fueling sys. addn. ENG-04-167-58-7, BEALE AIR FORCE BASE, CALIF. U. S. Eng., 1209 8th St., Sacramento, Calif. Bids Jan. 7, awarded Jan. 17. CD 1/9, under LB.

BUILDINGS—LB & CA

▲ **Richard Miller Constr.**, American Fork, Utah. LB **$1,646,134**. American Fork HIGH SCHOOL, AMERICAN FORK, UTAH. Alpine School Dist., Frank Jex, dir., American Fork, Utah. Bids Jan. 20. CD 10/17.

Cahill Brothers, Inc.-Foley Bros., Inc., 350 Sansome St., San Francisco, Calif., CA **$840,000**. 3 story 81 x 138 ft., concrete FERMENTATION BLDG. addn., VERNON, CALIF. Theodore Hamm Brewing Co., 2080 E. 49 St., Vernon, Calif.

CANADA

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
STREETS AND ROADS
February 19 Ontario

HEAVY CONSTRUCTION—LB & CA

▲ **Grayco Constructors Ltd.**, Kingston, Ont., CA 81.9 mi. of 486.2 mi. Gas Pipeline from Kapuskasing to Toronto, ONTARIO. Total est. **$28,000,000**. Trans-Canada Pipe Lines Ltd., 92 King St. E., Toronto, Ont. CD 4/27/55;
Majestic Contractors Ltd., Royal Trust Bldg., Edmonton, Alta., CA 83.1 mi. Gas Pipeline (Ontario);
Dutton-Williams Bros. Ltd., North Canada Oil Bldg., Calgary, Alta. CA 57.3 mi. Gas Pipeline (Ontario);
Canadian Bechtel Ltd., 25 King St. W., Toronto, Ont. CA 47.4 mi. Gas Pipeline (Ontario);
Morrison-Chivers Co. Ltd., 311 E. 11th St., Austin, Tex., U.S.A. and Dryden, Ont., CA 62.1 mi. Gas Pipeline (Ontario);
Price Constr. Co. & Poole Constr. Co. Ltd., 10503 109th St., Edmonton, Alta., CA 62.8 mi. Gas Pipeline (Ontario);
Oklahoma Pipeline Constructors Ltd., Markham, Ont., 91.6 mi. Gas Pipeline (Ontario). CD 4/27/55.

▲ **A. Janin & Co., Ltd.**, 1460 Sherebrooke St. W., Montreal, Que., LB **$1,582,775**, constr. 5th section Decarie-Raimbault Collector Sewer, between Metropolitan Blvd. and Vezina St., MONTREAL, QUE. City, City Hall, Montreal, Que. Bids Jan. 15, CD 12/30.

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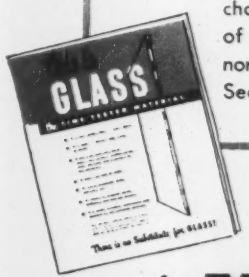

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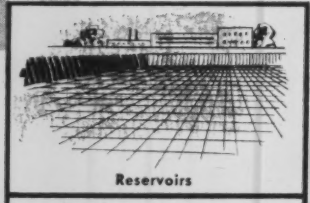
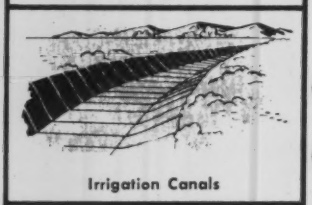
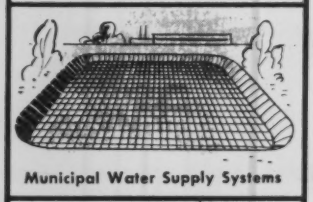
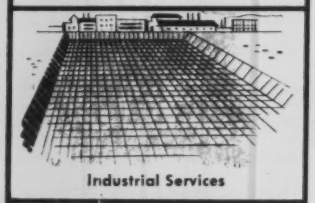
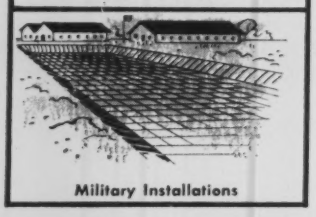

Reservoirs


Irrigation Canals


Municipal Water Supply Systems


Industrial Services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BUILDINGS—LB & CA

▲ **Utah Constr. Co.**, 142 East Third S. St., Salt Lake City, Utah, U. S. A., CA Est. $20,000,000. POTASH PLANT, 130 mi. northeast of Regina, ESTERHAZY (SASKATOON) Sask. International Minerals & Chemical Corp. (Canada) Ltd., Regina, Sask. CD 9/11.

FOREIGN

HEAVY CONSTRUCTION—BA

▲ **Thailand**—BA 4/14—Royal Irrigation Department of Thailand, Bangkok, Thailand, constr. and completion of Bhumiphol Dam (Yanhee Dam) Powerplant and appurtenant structures on Ping River about 65 kilometers upstream from Tak in northwestern part of Thailand and approx. 420 kilometers north of Bangkok by Air. Plans deposit $10. Extended date. CD 11/18.

PROPOSED PROJECTS

WATER SUPPLY

▲ **D. C., Wash.**—D. C. Govt., Sanitation Dpt., 14th and Pa. Ave. N.W.,
water mains at Delecarlia filtration plant at east end of Georgetown Reservoir. $975,000.
water main at low service relief main, 6th and N Sts., N.E. and 1st and N. Sts. N.E. $855,000.
water main, Sousa Bridge to Benning Rd. N.E. $629,000.
trunk water main, 6th St. N.E. Brentwood Rd. to Florida Ave. N.E. $200,000.
water main Pennsylvania Ave. to Constitution Ave. N.W. $146,000.

SEWERS, WASTE DISPOSAL

▲ **D. C., Wash.**—D. C. Govt., Sanitation Dpt., 14th and Pennsylvania Ave. N.W.,
sewage treatment plant addns. $2,500,000.
"L" St. relief sewer 22nd to 17th Sts. N.W. $1,500,000.
storm sewer vicinity 49th St. and Massachusetts Ave. and Fordham Rd. N.W. $559,000.
storm sewer Polk St. between Kenilworth, Minnesota Aves. 48th to Nash Sts. to 48th Place N.E. $375,000.
combine sewer, slash run, New Hampshire Ave. between River and Washington Circle. $1,581,000.
storm sewers, Emerson St. Valley, Miscellaneous locations. $332,000.
main sewerage pumping station-sewage screens and hydraulic imprvs. $300,000.
storm sewer 41st and Clay Sts., to Benning Rd. and East Capitol St. $250,000.
storm sewers, Oxon Run Valley, misc. locations. $202,000.
storm sewers Watts Branch between Minnesota and Southern Aves. $190,000.
storm sewers 49th and Massachusetts Ave. and Alton Pl. N.W. $156,000.
storm sewers 6th, Brandywine Chesapeake Sts. and Southern Ave. $132,000.
bulkhead, sewage pumping station yard, steel piling. $100,000.
storm, sanitary water Kenilworth Courts, Kenilworth Ave. and Charles St. N.E. $85,000.

▲ **O., Youngstown**—Comrs. Mahoning Co., Courthouse, sewage disposal plant to serve Boardman Twp. west of Mill Creek, approx. 10 sq. mi. area, near Mill Creek and Shield Rd. $1,500,000. CD 7/26.

▲ **Tenn., Memphis**—City City Hall, drainage. $1,000,000; sewers, $1,000,000; interceptor sewer, $2,000,000.

▲ **Wis., Fond du Lac**—City, filtration plant, intake line, $1,750,000, Bids probably in April, Consoer, Townsend & Assocs., 360 E. Grand Ave., Chicago, Ill., consult. engrs.

STREETS AND ROADS

▲ **Tenn., Memphis**—City, City Hall, repairing street and roads. $3,500,000.

EARTHWORK, WATERWAYS

▲ **Connecticut**—State Water Comn., 165 Capitol Ave., Hartford, Rooster River Flood Control Project, Bridgeport and Fairfield. $1,500,000. Anderson-Nichols & Co., 150 Causeway St., Boston, Mass., consult. engrs. CD 1/4/57.

AIRPORTS

▲† **Va., Chantilla**—AIRPORT—Civil Aeronautics Admin., 16 and Constitution Ave. N.W., Wash., D. C., airport for District of Columbia. Site selected. $12,500,000, appropriated. CD 7/23/51, under Va., Burke.

FOREIGN

▲ **Italy, Rome**—TERMINAL BLDG.—Ministry of P. Wks., Rome, plans terminal building at Fiumicino Airport near here. $5,000,000. Bids soon.

PUBLIC BUILDINGS

▲ **Ariz., Florence** — CELL BLOCK — State Planning Comn., Phoenix, cell block at Arizona State Prson. $1,282,000.

▲ **Calif., Citrus Heights**—SCHOOLS—Sylvan Elementary School Dist., c/o Supt., 7137 Auburn Blvd., voted $700,000 bonds Dec. 17, schools in Grand Oaks, South Mariposa and Sylvan School addns. $2,700,000.

(Continued on page 70)

ALL-PRO TEAM

THE bedrock of an engineering and construction company is the corps of key men in key positions—permanent men whose skill and knowledge have been built up through years of experience in a wide variety of jobs. Pictured here are just a few of the men who make up the permanent organization of F. H. McGraw & Company: engineers, cost accountants, construction superintendents and foremen who have handled more than a billion dollars worth of engineering and construction in the past 28 years.

In all phases of construction, from preliminary design through finished building and mechanical installation, McGraw men have compiled an impressive record of achievement for the major firms in American Industry and for Government. McGraw men and machines are tooled and ready to take on any engineering and construction assignment. We would be happy to have a McGraw engineer call to discuss your construction needs—with no obligation, of course.

MEN OF McGRAW

The professional construction men who make up the McGraw team include some who have been with the company nearly a quarter of a century, and many who have nearly 20 years' service. Included are "pros" like Field Accountant "Patty" O'Brien, a 24-year veteran; Project Manager John Galley, 11 years; Construction Foreman "Bronco" Monacchio, 22 years; Field Engineer "Jiggs" Ossenfort, 16 years; Project Engineer George Fulton, 12 years; Chief of Supply Bob Moeller, 23 years; Construction Superintendent Mike Dykun, 19 years.

These men, and others like them, are veterans of major McGraw construction achievements for such clients as Ford Motor Co., U. S. Steel, Kimberly-Clark, Union Carbide, Westinghouse, General Aniline, U. S. Rubber and other leading industrial firms.

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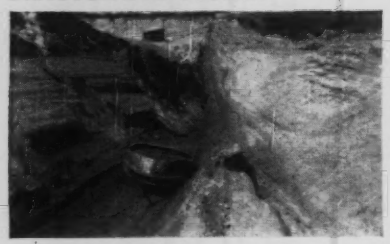
SAUERMAN Systems...

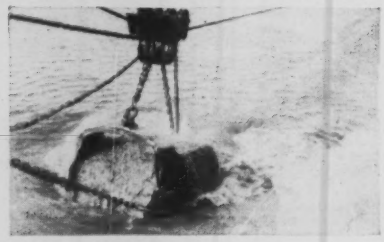
DRAGSCRAPER SYSTEM



Digging and Hauling

Four cents per ton includes all operating costs for this DragScraper installation. The 2-yd. unit digs and hauls on an average span of 450 ft. (*Request Sauerman News 148.*)

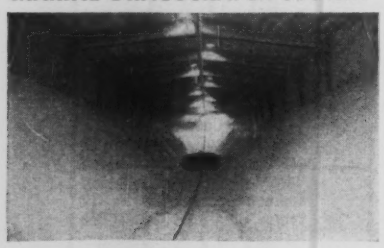
SLACKLINE CABLEWAY SYSTEM



Deep digging

Slackline Cableway Bucket breaks water with a heaping load from 100-ft. depth. A Sauerman Slackline is the low-cost method for underwater digging. (*Request Sauerman News 147.*)

MARINE DRAGSCRAPER SYSTEM



Self-unloading barges

DragScraper Machines provide more cargo space, do a thorough clean-up job in the hold, and lower costs of transporting bulk material by barge. (*Request Marine Brochure MB-1.*)

Ask for Catalog A, DragScrapers, Catalog C, Slackline Cableways and Marine Brochure MB-1 for complete description of these Sauerman Methods.

SAUERMAN BROS., Inc. 632 S. 28th AVE. Linden 4-4892
BELLWOOD, ILLINOIS

(Continued from page 68)

▲ **Calif., Oakland**—SCHOOL—Oakland Bd. Educ., c/o Supt., 1025 2 Ave., plans by Warnecke & Warnecke, Financial Center Bldg., Hill Area High School, Skyline Blvd. $4,000,000. CD 7/12.

▲ **Calif., Oroville**—SCHOOL—Oroville Union High School Dist., 1535 Bridge St., high school. $1,565,500.

▲ **Colo., Pueblo**—SCHOOLS—School Dist. No. 60, 102 W. Orman Ave., two Junior High Schools, Elementary School and addns. $4,500,000. CD 10/11/54.

▲ **Colo., Westminster**—SCHOOLS—Adams County School Dist. No. 50, 7300 Lowell Blvd., plans by Roland M. Johnson, 1731 York St., Denver, and Paul R. Reddy, 303 Redding-Miller Bldg., Denver, archts.-engrs., grade School, Bottonwood Dr. and Edmwood Lane; grade school 86th and Lowell; grade school, 74th and Irving; grade school, 78th and Pecos; Junior High School, 78th and Tejon. $2,000,000. CD 1/23/56.

▲ **Conn., Enfield**—SCHOOL—Town, Town Hall, plans by Olson & Miller, 742 Asylum Ave., Hartford, high school, $3,000,000. John P. Legnos, 30 Gillett St., Hartford, consult, engr. CD 12/19.

▲ **Ill., Springfield**—CITY HALL—City plans city hall. $2,000,000.

▲ **Ind., Terre Haute**—DORMITORY—Indiana State Teachers College, Allendale Lodge, Terre Haute, plans by Miller, Vrydagh & Miller, 200 Opera House Bldg., 6 story, 75,000 sq. ft., rein.-con., masonry, steel dormitory. $1,500,000. Ralph A. Stuart, 211 Opera House Bldg., mech. engr. Homer A. Howe, 204 Opera House Bldg., structural engr.

▲ **Mass., Framingham**—DORMITORY, etc.—Commonwealth of Mass., Dpt. Educ., c/o Div. Bldg. Constr., 38 Chauncy St., Boston, plans by W. Chester Browne & Assoc., Inc., 184 Boylston St., Boston, dormitory and student union bldg., incl. dining hall at State Teachers College. $1,179,000. CD 12/19/56.

▲ **Mich., Portage**—SCHOOLS—Portage Twp. School Dist. Bd. Educ., Portage, plans by M. C. J. Billings, 211 Woodward St., Kalamazoo, high school and elementary school. $2,350,000. CD 11/19.

▲ **N. J., Keansburg**—SCHOOL—Bayshore Regional High School Dist., Keansburg, high school for Union Beach-Keansburg. $1,500,000.

▲ **N. Y., Clarence**—SCHOOL—Clarence Bd. Educ., Clarence, plans by Kideney, Smith and Fitzgerald, 220 Delaware Ave., Buffalo, elementary school in Harris Hill. $1,100,000.

▲† **N. Y., New York**—STORES CONVERSION—General Services Admin., 18 and F Sts. N.W., Wash., D. C. conversion of appraisers' stores, 201 Varick St. for occupancy by Atomic Energy Comn. $1,800,000. Lockwood Greene Engineers, Inc., 41 E. 42 St., New York, N. Y., consult. engr.

▲ **N. Y., Tonawanda**—SCHOOLS—Kenmore-Tonawanda School Bd., 1500 Colvin St., bond election Feb. 4, Alexander Hamilton Elementary School, Westfall and St. Amelia Dr., $1,800,000; DeWitt Clinton Elementary School at Orchard Dr., $850,000. CD 3/15/55.

▲ **O., Tiffin**—SCHOOL—Bd. Educ., Tiffin, bond election May 6, high school. $1,967,000. CD 11/12.

▲ **Tenn., Knoxville**—AUDITORIUM, etc.—City, City Hall, plans by Painter, Weeks & McCarty, 618 Church Ave. S.W., and Morton & Sweetser, Journal Bldg., auditorium and coliseum. $3,000,000. CD 12/2.

▲ **Tenn., Knoxville**—HOSPITAL—State Mental Health Dpt., Capitol, Nashville, plans by Lindsay & Maples, 1301 Hannah Ave. N.W., hospital addn. $2,000,000. CD 11/11/53.

▲ **Tex., Andrews**—SCHOOL—Andrews Independent School Dist., Andrews, high school. $2,000,000.

▲ **Tex., Arlington**—SCHOOLS—Arlington Independent School Dist., c/o J. C. Ferguson, pres. Bd., Arlington, bond election Feb. 15, elementary schools, high school and existing high school addns. $5,000,000. Preston M. Geren, 1607 Fort Worth Natl. Bldg., Fort Worth, archt. on elementary schools. CD 10/6/55.

▲ **Tex., College Station**—PETROLEUM, etc.—Texas A & M College, College Station, petroleum bldg., $850,000; plant science bldg., $1,080,000. Constr. 1958.

▲ **Wash., Fort Lewis**—HOUSING—U. S. Eng., 4735 E. Marginal Way, Seattle, Zone 4, plans by Jones, Lovegren, Helms & Jones, Republic Bldg., Seattle, Zone 1, 375 unit, frame Capehart family housing at American Lake, $6,000,000, Bids about Feb. 26. CD 1/2, under LB.

▲ **Wis., Oshkosh**—SCHOOL—Bd. Educ., Oshkosh, plans by Associated Oshkosh Architect, Box 813, Oshkosh, high school. $3,500,000. CD 11/26/56.

COMMERCIAL BUILDINGS

▲ **Ala., Huntsville**—MOTEL—Pick Hotels Corp., 20 N. Wacker Dr., Chicago, Ill., 150-unit motel. $1,250,000.

▲ **Calif., Palo Alto**—DORMITORY—Stanford University, Palo Alto, plans by Weihe, Frick & Kruse, 414 Mason St., San Francisco, remodeling Encina Men's Dormitory, $1,350,000. CD 4/8/53.

▲ **Calif., Santa Clara**—UNIVERSITY ADDNS.—University of Santa Clara, Santa Clara, student union and dormitory bldg., $1,500,000; engineering bldg. $1,000,000; science annex, $450,000.

▲ **Colo., Denver**—OFFICE—Capital Properties, Co., c/o Joe Lort, Jr., archt. 211 Clayton St., 8 story, 6,000 sq. ft. on each floor, 2 levels parking area below grade, office bldg. $1,250,000. Robert Nedell, 723 Delaware St., consult. engr.

(Continued on page 72)

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Kinnear Steel Rolling Doors are **Registered.** Full details on every door are held in fireproof vaults. Kinnear Doors *never* become "orphans". Worn or damaged parts are replaced even after 50 years of door service.

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Shoring strength pays off with safer, faster tunneling under nation's capital

Tunneling in the midst of some of the nation's historic buildings—the U.S. Capitol, Supreme Court, Senate Office Buildings, Library of Congress and the Methodist Building—Square Construction Company of Baltimore, Maryland, is constructing a 2100 foot sewer tunnel system. And at no time during the tunneling operation is the free flow of traffic or the beauty of the area overhead being interfered with.

THE OUTSTANDING SHORING STRENGTH of the Commercial steel tunnel liners being used on the job is an important factor in keeping senators and railroad trains directly overhead on schedule. This despite the fact that both the senatorial subway between the Capitol and the Senate Office Buildings and a railroad tunnel to Washington's Union Station are only five feet above the new tunnel for at least 40 feet of its length.

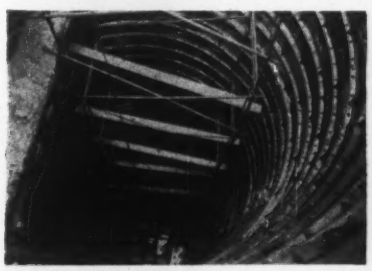
A SAVING OF $15,000 on material handling alone has been made possible because of the easier, one-man handling of Commercial liner plates. Only six sand hogs are required in the tunnel heading during each working shift.

The first of three shafts on the job, 65 feet deep and 17 feet in diameter, was completed in just one week because of the ease of installing Commercial liner plates. Rapid progress is being made on the six-foot high by six-foot wide tunnel being excavated through wet gray silt, sand, clay and organic matter.

INHERENT DESIGN ADVANTAGES of Commercial liner plates—continuous inside flange with solid corners, easier flange-to-flange bolting all in the open, precision-matched bolt holes—made for quicker, simplified erection and superior shoring strength.

"Commercial tunnel liners have made this operation simple, neat and economical," says Frank P. Ragonese, President of the Square Construction Company. He adds, "They insure the safety of our workers and eliminate the hazards of cave-ins."

ENGINEERING ASSISTANCE—The benefit of Commercial's 25 years of experience in the design of supports for soft ground or rock tunnels is yours for the asking. Just call on Commercial in the planning stage of your next tunnel project—sub-surface or surface, long or short. There's no obligation. Write to The Commercial Shearing and Stamping Company, Dept. E-5, Youngstown 1, Ohio.



TUNNEL ENTRY SHAFT on First Street will be connected with a second working shaft in front of the Capitol by 1600 feet of tunnel right under Constitution Avenue, which will in no way interfere with traffic directly overhead on Washington's busy thoroughfare.

FOR GREATER ECONOMY, coarse-threaded bolts inserted through matching holes in the continuous inside flanges speed installation progress, while the 8,000 Commercial liners used on the job save on metal—will vary in thickness as best suits the load

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A 2½ mile section of 4-lane divided concrete highway linking the New York State Thruway with the New Jersey Garden State Parkway was completed by George M. Brewster & Son, Inc., using seven Dumpcretes to handle 30,000 cu. yds. of concrete from portable plant.

Dumpcretes can reduce:

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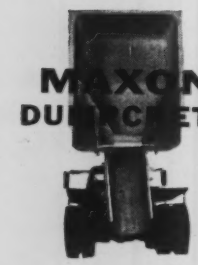

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FAST Especially designed cutting blade and dies assures fast cutting action. The hammer principle eliminates any special skill requirements.

CLEAN Wire rope ends are cut smooth and clean for perfect threading or splicing.

SAFE The enclosed cutting blade locked in the body of the cutter assures perfect safety.

PORTABLE Models for tool kit or stationary operation. With cutting capacities up to: 1 inch, 1-1/16 inch, 1-1/2 inch.

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MORSE-STARRETT PRODUCTS CO.
1204 - 49th AVENUE, OAKLAND 1, CALIFORNIA

(Continued from page 70)

▲ **Colo., Pueblo**—HOTEL—L. L. Stroud Enterprises, 2736 Central Ave., Phoenix, Ariz., constr. Town Park Hotel. **$1,500,000.**

▲ **La., Baton Rouge**—MOTEL, etc.—Baton Rouge Investors, c/o Herbert Linic, Baton Rouge, or c/o Carlos B. Schoeppl, archt., 2701 Biscayne, Miami, Fla., motel, incl. swimming pool. **$1,500,000.** Geo. P. Rice, 400 Audubon, New Orleans, engr.

▲ **La., Baton Rouge**—STUDENT UNION—Southern University & A & M College, Dr. C. R. Clark, pres., Southern Branch, Baton Rouge, plans by August Perez & Assocs., 314 Anderson Bldg., New Orleans, student union. **$2,600,000.**

▲ **Mo., Kansas City** — RELIGIOUS CENTER — Rabbi Gershon Hadas, Beth Shalom Congregation, 3400 Paseo, Kansas City, Mo., plans by Perkins & Will, 309 W. Jackson, Chicago, Ill., Bloomgarten & Frohwerk, and Manuel Morris & Robert Sixta, both of Ry. Exchange Bldg., Kansas City, Mo., 43,000 sq. ft., 3 bldgs. religious center connected by breezeways, Wornall Rd. and Bannister. **$2,500,000.**

▲ **Mo., St. Louis**—MULTI-PURPOSE OFFICE—Joseph A. Campagna Corp., 18 S. Kings highway, Zone 8, plans by Robert Elkington, 7916 Kingsbury, Clayton, Zone 24, and George E. Heneghan, Jr., assoc. archt., c/o archt., conversion 11 story stockroom and warehouse bldg. at southwest corner 10th and St. Charles Sts. to multi-purpose structure for offices, retail stores and other commercial purposes, incl. air-conditioning, new elevators, etc. Over **$2,000,000.** Wells & Wells, Inc., Security Bldg., 319 N. 4th St., Zone 2, consult. engr. CD 1/13.

▲ **O., Lakewood**—APARTMENT—The Robert L. Ranke, Inc., 1823 Columbus Rd., Cleveland, Zone 13, 10 story apartment and 35 suite garden apartment, **$3,000,000-$4,000,000.**

▲ **O., Youngstown**—HOUSING—Wm. P. Gale & L. J. Dankovich, 410 E. La Clede St., housing, 49-acre site in McKelvey Heights, on Mariner Ave., along Liberty Rd. **$2,000,000.**

▲ **Tenn., Nashville**—HOSPITAL WING, etc.—Baptist Hospital, 2000 Church St., 14 story hospital wing, laundry, boiler room, 6 story professional bldg. **$6,750,000.**

▲ **Tenn., Nashville**—HOSPITAL WINGS—St. Thomas Hospital, Hayes Ave., hospital wings addn. **$1,640,000.**

▲ **Tex., Midland**—SHOPPING CENTER—Houston Smith 109 S. Grand St., Odessa, shopping center, 15-acre site northwest section of here. **$2,000,000.** Sears Roebuck & Co., lessee.

▲ **N. B., Campbellton**—HOSPITAL, etc.—Soldiers' Memorial Hospital Bd., 35 Arran St., hospital addn., renovations. **$1,200,000.** Bids in May.

▲ **Ont., Lindsay**—HOSPITAL, etc.—Bd. of Governors, Ross Memorial Hospital, plans by Marani & Morris, 1250 Bay St., Toronto, hospital addn., alterations, **$1,150,000.** CD 11/12/54.

▲ **Que., Montreal**—HOUSING—Central Mortgage & Housing Corp., 56 Lyon St., Ottawa, Ont., 210 unit Low Cost Housing, sponsored by Joseph Ain of Montreal, **$1,544,021.**

INDUSTRIAL BUILDINGS

▲ **N. J., Newark**—GARAGE—Prudential Insurance Co. of America, 763 Broad St., plans by Voorhees, Walker, Smith & Smith, 101 Park Ave., New York, N. Y., 6 story red brick parking car garage, Plane St. between Bank and Academy Sts. **$1,000,000.** Target for completion Oct. 1959. CD 1/13.

▲ **N. Y., Mount Kisco**—BAKERY, OFFICE—Arnold Bakers, Inc., 10 Traverse Rd., Port Chester, plans by J. Edwin Hopkins, 24 W. 40 St., New York, Zone 36, constr. bakery and plans by Lathrop Douglass, 518 Fifth Ave., New York, Zone 18, office bldg. on 10½ acre tract on Rte. 117 and Norm Ave. **$2,000,000.** CD 10/18, under N. Y., Bedford Hills.

▲ **Pa., Bensalem** — INDUSTRIAL PARK — Fechtenberg Realty Co., Eddington, plans by Frank M. Bstes & Assocs. consult. engrs.-archts., Radcliffe St. and Green Lane, Bristol, 29 buildings in industrial park, **$2,500,000.**

▲ **Tex., Evadale**—MILL EXPANSION—East Texas Pulp & Paper Co., Evadale, paper mill expansion **$7,000,000-$8,000,000.** Brown & Root, Inc., Engineering Dpt., 4600 Clinton St., Houston, Tex. and H. Simons Ltd., 16 E. Hastings St., Vancouver, B. C., consult. engrs. Bids first quarter 1958. CD 12/27.

▲ **Ont., Brantford**—PLANT—Brantford Coach & Body Ltd., 22 Mohawk Rd., 80,000 sq. ft. plant (to be used for tractor assembly), Mohawk Rd. **$1,250,000.** Bids in about 2 mos. A. D. Margison & Assocs. Ltd., 30 Eglinton Ave. E., Toronto, consult. engrs.

▲ **Ont., Toronto**—WAREHOUSE, etc.—Goodyear Tire & Rubber Co. of Canada Ltd., Lake Shore Rd., warehouse and office bldg. **$2,000,000.**

UNCLASSIFIED

▲ **Mass., Shirley**—RACE TRACK, etc.—Central Racing Assocs., Inc., William J. Downing, vice pres., Littleton Common, Littleton, plans by Tekton Assoc., Inc., archt. and consult. engr., 220 Central St., Natic, race track, incl. stable, grandstand and 3 story clubhouse. Ayer, Patterson and Clark Rds., **$4,300,000.** Constr. 1958.

▲ **Wash., Tacoma**—STADIUM—City, City Hall, baseball stadium. **$1,000,000.**

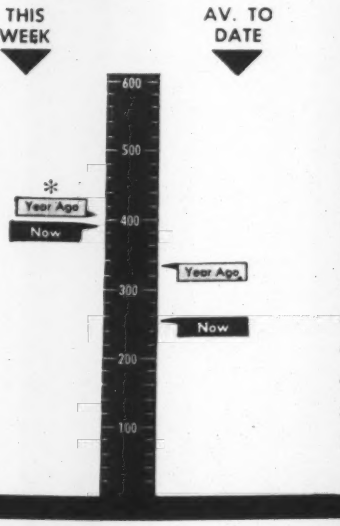
▲ **Wash., Tacoma** — LIGHTING SYSTEMS — City, City Hall, **$1,040,000** bond election Mar. 11, street lighting sys. CD 12/20.

(Proposal Advertisement see pp. 79 to 81)

Construction Scoreboard

ACTIVITY THIS WEEK

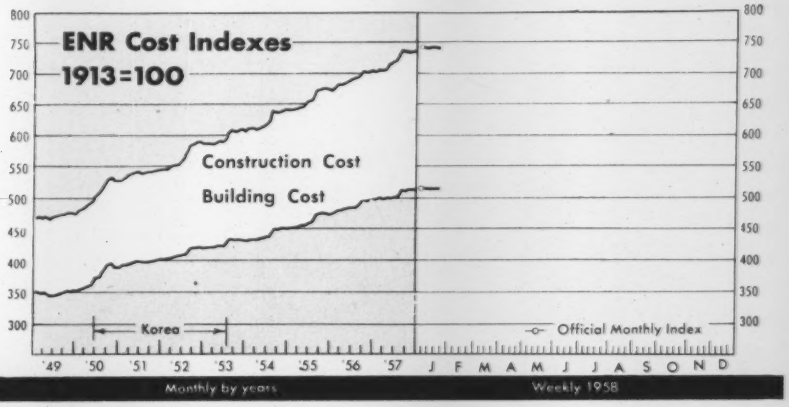
Contract Awards
Millions of Dollars



COST INDEXES AS OF NOW

ENR INDEXES (1913=100), 20-cities' average	Week of Jan. 23 1958	% of Change from Dec. 26 1957	% of Change from Jan. 24 1957
Construction Cost	743.45	+0.7	+4.9
Building Cost	516.06	+0.01	+2.7

To convert above indexes to 1926 = 100: Divide Construction Cost by 2.060; Building Cost by 1.850
1940 = 100: Divide Construction Cost by 4.770; Building Cost by 3.518



*6-day-week

AMOUNT OF CONTRACTS LET

By Ownership	This Week millions	Cum. 5 wks 1958 millions	Chge '57-'58 %
All Heavy Constr.	$389.8	$1258.8	−24
Private	140.0	521.2	−30
Public	249.8	737.6	−20
State & Municipal	215.8	611.3	− 8
Federal	34.0	126.3	−50
By Type of Work			
Public			
Waterworks	1.0	23.1	+48
Sewerage	11.2	59.4	+ 2
Bridges*	12.7	27.4	−57
Highways	51.3	198.1	−26
Earthwork, Waterways	99.9	120.0	− 3
Buildings, Excl. Housing	32.6	176.4	−17
Housing	33.5	87.7	+37
Unclassified	7.7	45.5	−62
Private			
Mass Housing	43.4	181.7	−39
Commercial	35.5	128.6	+67
Industrial	60.0	172.6	−49
Unclassified	1.0	38.3	+36

*Includes private bridges.

NOTE: Minimum size projects included are: Waterworks and waterways, $44,000; other public works, $73,000; industrial buildings, $93,000; other buildings, $344,000.

NEW CAPITAL FOR CONSTRUCTION

	Week of Jan. 23 millions	Cum. 4 wks 1958 millions	Chge '57-'58 %
Corporate Securities	$189.9	$300.9	−41
State and Municipal:			
All Except Housing	151.8	527.7	+49
Housing	....	0.7	....
Federal Loans	6.8	27.9	+166
Federal Aid	....	....	....
Total Nonfederal	$348.5	$857.2	− 2
Federal Appropriations:			
Projects in U. S.	....	....	....
Outside U. S.	....	....	....
Total New Capital	$348.5	$857.2	− 2

BACKLOG OF PROPOSED HEAVY CONSTRUCTION

	Dec. 1957 (millions)	Percent Change from last Month	Year
Total U. S. (ENR reported)	$111,482	+0.6	+6.9
By Ownership—			
Private	46,926	+0.5	+7.5
State and Municipal	50,551	+0.7	+7.6
Federal	14,005	+0.5	+2.7
By Type of Work—			
Waterworks	2,422	+0.9	+8.7
Sewerage	3,362	+0.6	+4.6
Bridges	3,313	−2.2	+12.2
Highways	13,180	+1.3	+4.0
Earthwork, Waterways	12,370	−0.1	+8.3
Public Buildings	20,208	+0.5	+7.0
Industrial Buildings	16,774	−0.02	+3.9
Commercial Buildings	20,253	+0.8	+11.2
Unclassified, Private	9,899*	+0.6	+6.6
Unclassified, Public	9,702	+1.3	+5.0

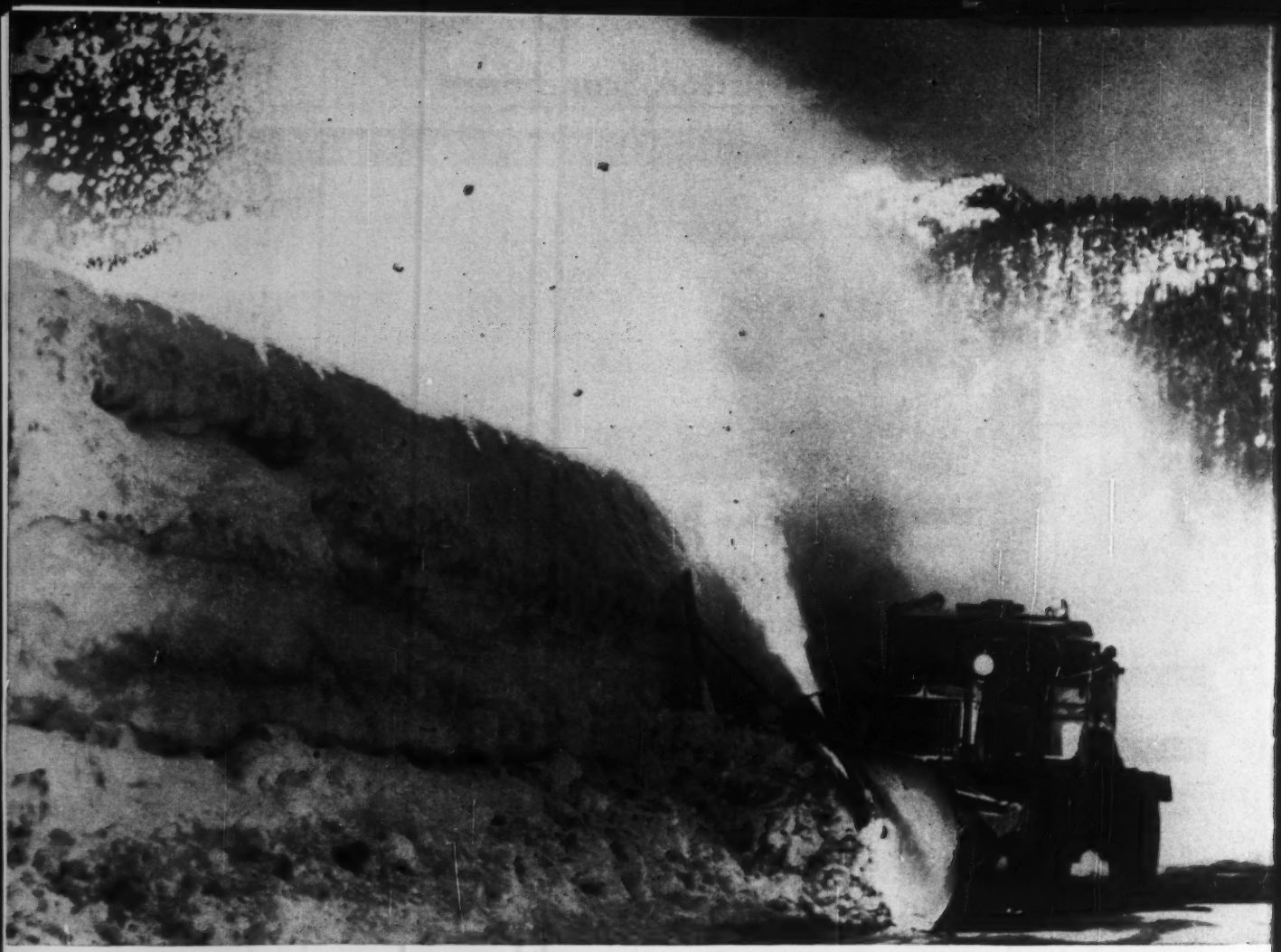
* Includes private bridges, $88 million

FLOW OF NEW PROJECTS INTO THE BACKLOG

	1957 Dec. (millions)	1957 12-months (millions)	Percent Change from '56 Dec.	Year Cum.
Total U. S. (ENR reported)	$1,342	$20,376	−23.4	−20.5
By Ownership—				
Private	508	8,883	−39.9	−30.7
State and Municipal	725	9,650	− 7.8	−10.7
Federal	109	1,843	−10.2	− 3.5
By Type of Work—				
Waterworks	38	490	+ 3.7	− 8.1
Sewerage	58	614	− 4.1	− 1.6
Bridges	34	651	+79.1	+42.3
Highways	263	2,505	+9,064.7	+ 6.5
Earthwork, Waterways	3	1,616	−99.0	+49.8
Public Buildings	305	4,301	− 7.8	−13.8
Industrial Buildings	92	3,159	−78.7	−47.5
Commercial: Mass Housing	219	2,238	+68.1	−28.4
Other Building	128	2,450	−43.4	− 8.6
Unclassified, Private	70	1,036	+20.1	+ 3.4
Unclassified, Public	134	1,317	−12.6	−52.8

FLOW OF PROJECTS OUT OF BACKLOG INTO CONTRACTS

Total U. S. (ENR reported)	507	9,367	−38.9	− 5.9
By Ownership—				
Private	186	3,505	−63.6	−35.3
State and Municipal	282	4,580	+16.3	+25.4
Federal	38	1,283	−48.8	+44.6



USS "T-1" Steel, hardened to 321 minimum Brinell, has increased chute liner life 200 to 300%.

How many rocks can a snow plow chew?

Ordinarily, none at all. Rocks usually snarl up the works. But the "Snow-Hawg," built more than 70% of USS "T-1" Steel, wades right through.

For the first time, a rotary snow plow operator does not have to back off from rock, mud or dirt slides. The "Snow-Hawg" digs into such debris with relish, throwing chunks of snow, ice, and rock as far as 300 feet.

The revolutionary "Snow-Hawg," developed by the Equipment Superintendent of a Northwestern State, is being manufactured by Rudy Yost Equipment, Portland, Oregon. Basically, it's a truck-mounted accessory that has the advantages of being lightweight, fast, highly efficient and low in cost. The "Snow-Hawg" owes much of this success to USS "T-1."

First, by using USS "T-1" Steel for most of the vital parts, the "Snow-Hawg's" weight was reduced to 3,000 pounds, less than half that of comparable units. Score one for "T-1" Steel's high yield strength—nearly three times that of structural carbon steel.

Second, by using "T-1" Steel in wear areas, the life of the chute liner and similar parts was increased up to 300%. Score two for "T-1" Steel's terrific resistance to impact abrasion.

Third, not one steel failure has occurred in "Snow-Hawg's" operating at temperatures down to -20°F. Score three for "T-1" Steel's exceptional toughness, even at sub-zero temperatures.

Why not follow the "Snow-Hawg's" lead? Take advantage of the unique combination of properties offered by USS "T-1" Steel. It may be the most economical steel you can use. (And remember that we produce a full range of Stainless, Alloy, High Strength, and Carbon Steels for every application.)

Our new catalog—USS "T-1" Steel—contains complete technical information and practical suggestions for its use that can save you money. For a free copy, write to United States Steel Corporation, Room 2801, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

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USS United States Steel

Money Costs Drop

Discount, prime interest rates lowered in some cities; may aid building

If there remained any slight doubts as to the future downward trend of interest rates, they were dispelled last week when seven of the nation's 12 Federal Reserve banks chopped their discount rate to 2.75% from 3%. The action brought quick response from many of the nation's largest commercial banks who sliced their prime interest rate from 4½% to 4%. The prime rate is the amount charged to a bank's biggest customers with the best credit rating. From this rate, all other lending rates are scaled upward. The discount rate is the amount charged by Federal Reserve banks to member institutions.

The prime rate reduction was led by Chase Manhattan Bank, the largest bank in New York City, and was soon followed by similar reductions in Philadelphia, Cleveland, St. Louis, Los Angeles and San Francisco. Among them was the nation's largest bank—Bank of America in San Francisco.

The discount rate was cut by the Federal Reserve banks in New York, Cleveland, Chicago, St. Louis, Kansas City and Philadelphia. Yet to make the move, but expected to do so shortly, are the reserve banks in Dallas, Boston, San Francisco, Atlanta and Minneapolis.

• **Mortgage market possibilities**—The rates on home mortgages, which in some sections of the nation ranged close to 7% may dip. And home mortgages insured by the Federal Housing Administration will undoubtedly become more attractive because of the allowable interest rate of 5¼%, plus discounts ranging from ½% to 3% of the amount loaned, depending on the region. But a still heftier decline will have to be seen before home loans guaranteed by the Veterans Administration become popular. The rate is 4½%.

• **Encouragement for local governments**—The downward drift of interest rates may also serve to push state and municipal governments into the money market to finance public works programs that in some cases may have been postponed because of the high interest charges prevailing in the early part of 1957's fourth quarter.

The same decline may also see some large corporations entering the money market in the near future, but it should be noted that the appearance of large corporate issues will not necessarily indicate a resurgence in outlays for expansion. The new financing would be used to pay off the outstanding high cost debt with funds borrowed at a lower interest cost.

New Lease on Life

Lease-purchase construction bids are below estimate

Construction bidders last week beat the government cost estimate by a big margin at the first bid opening for a lease-purchase project since the General Services Administration revived the program last fall. The keen bidding buttressed hopes that 40 or more similar projects may be placed under construction contract this year.

Last week's opening gave the first answer to the question of whether contractors can build lease-purchase jobs within the cost estimates. On the basis of bids which were submitted in the initial test, there is strong belief that they can.

Eleven bidders tendered offers that ran 23% to 31% below the $5.8 million estimate for a federal office building in Albuquerque, N. M. Private funds to cover costs—up to the maximum amount of the estimate—already have been assured for the project as a result of competitive bidding among investors last December (ENR Jan. 23, p. 24).

Bid prices for the Albuquerque project, as revealed at the opening in the Denver regional office of GSA, ranged from a low of $4,017,000 to a high of $4,499,970. C. H. Leavell and Co. of El Paso, Tex., was the low bidder.

Another test of contractor pricing vs cost estimates was due this week with the opening of bids for a post office and courthouse at Council Bluffs, Iowa. Maximum financing available for this project is $1,690,000. A third test will come next when bids are opened for another post office and courthouse at Kansas City, Kan., where private financing is assured up to a limit of $2,100,000.

If these openings confirm the trend indicated by Albuquerque bids, contractors can look forward to advertising of some 20 additional projects within the next few months. GSA now has private financing in hand for 14 projects that add up to an estimated total of $41.5 million, and it has invited investor bids next month for 14 more, generally of smaller size.

Playing It Safe

Defense Department works on new plan to back-stop Capehart housing program

The expected easing of the mortgage market will give the Capehart housing operation a lift this year, but despite that possibility, the Defense Department has decided that it cannot place all its faith in that program as it exists today.

The department's housing office is currently developing a plan for a new housing corporation that would have the authority to raise funds in the private market to build needed projects for the military. Officials hope the plan—not yet fully detailed—will be presented to Congress for action this year.

As envisioned by Defense Department authorities, the new housing corporation would back up and supplement the present Capehart housing program and would be most effective if money were to remain tight, or if private investors fail to come forth with Capehart mortgages.

• **Plans for this year**—If the mortgage market does loosen up as predicted, the military services expect to place 50,000 family units of Capehart housing under contract at some 100 projects this year.

This would be double the 1957 rate when the tight credit condition held down the program of privately financed housing for military families. Most contractors obtained the needed financing for their projects from the Federal National Mortgage Association (Fannie Mae), which had committed $319 million of government funds to Capehart housing by the end of last year.

• **Limited funds now**—At the start of this year, only $97 million of these government mortgage funds for Capehart housing were available, an amount sufficient for starting approximately 6,300 units.

Bidders on Capehart projects were put on notice that they must find private sources for mortgage funds. To attract this private money, financing rules have been liberalized to allow discounting up to four points on Capehart mortgages as an offset to the low interest rate of 4% fixed by law.

Some mortgage brokers even expect Capehart loans to be taken up as discounts lower than those allowed, perhaps as low as three points in a few months. This would result from a further easing in the money market.

Congress Gets Labor Law Message

The President would legalize pre-hire contracts, curb secondary boycotts, protect workers' rights and funds

President Eisenhower's Labor Message, presented to Congress last week, sets up the Administration's 1958 program for amending the Taft-Hartley Act and curbing corruption and racketeering in the labor-management filed.

As a multi-point program, dealing with many controversial areas of union activities and with corruption in labor-management relations, the President's special message is a middle-of-the-road approach. As such, it has aroused protests from labor leaders and, at the same time, been labeled as "pro-union" by some management groups.

The prospect is for plenty of talk but little chance is given for Congressional action on much of the program submitted by the White House.

Basically, the Administration would put the activities of unions under more checks by the federal government—particularly union finances and voting methods.

And there are proposals for limiting boycotts and picketing—suggestions not to labor's liking. But there are also some things labor likes which do not appeal to management.

The building trades and the teamsters have been contributing to the labor corruption headlines that give whatever steam there is to the drive to get legislation this year. But odds are against legislation regulating union internal practices—and no one sees any chance at all for new legislation on such hot Taft-Hartley issues as hot cargo and organizational picketing.

• **Corruption**—These are the key proposals made by the President for dealing with corruption:

• A new post of commissioner of Labor Reports would be set up in the Labor Department to receive and publish the special reports to be required and to investigate and prosecute violations.

• Detailed annual reports would be required on all health, welfare or pension benefit plans—whether administered by unions or employers.

• All unions would have to file detailed annual financial reports on their own operations, and be able to show that members have the opportunity to elect, at intervals of not more than four years, their local officers directly by secret ballot and their national officers in the same way or through delegates elected by secret ballot.

• To expose conflict of interest deals, employers and unions would have to report all funds exchanged between employers and union officers.

• Unions or employers failing to file or guilty of filing false reports would be denied access to the processes of the National Labor Relations Board.

• Unions committing such violations would also be liable to revocation of existing bargaining certificates and loss "for an appropriate period" of their tax exempt status.

• **Taft-Hartley**—Here are the President's principal proposals for amending Taft-Hartley:

• The "hot cargo" type of secondary boycott, would be banned. (This would presumably cover the Kohler and Burt Manufacturing Co. type of cases and would also curb union efforts to enforce fabrication clauses in labor contracts). And picketing to organize a plant would be barred where employees have indicated they are against the union.

• Pre-hire contracts for the construction industry would be legalized by allowing building trades unions to be certified in certain cases without a prior election.

• The law would be amended to make it clear that employer contributions for apprentice training are lawful.

• Some restrictions against construction unions would be eased: They would be given the right to picket secondary employers working on a construction site with the preliminary employer, and to bargain with multi-employer groups.

• Economic strikers would be allowed to vote in representation elections.

• A jurisdictional gap, created by recent decisions of the U. S. Supreme Court, would be closed by giving the states authority to act in cases declined by the NLRB.

• **Prospects**—The President's message was, on the whole, well received by Congress. Almost everyone agrees the revelations of the McClellan rackets committee show the need for some corrective legislation. Nevertheless, there is little feeling among the legislators that much of the President's program—or any other labor program—will be adopted this year.

This is not so much because of outright opposition from labor or management to specific proposals. Rather, chances of prying open Taft-Hartley are considered slim because there is no united support behind a single program. Thus, the Senate and House labor committees will be bombarded by suggestions from all sides when hearings on new legislation begin, probably next month.

Management, as represented by the Chamber of Commerce and National Association of Manufacturers, will propose restrictions of the union shop, extension of the antitrust laws to unions to break up industry-wide bargaining and curbs on unions' political spending. Labor— and the Administration—oppose all of these.

Even on corruption, unions and management are divided. AFL-CIO President George Meany, though opposing the idea of closer federal regulation of internal union operations, is behind proposals for public reporting of all welfare and pension funds. But management is opposed to health and welfare bills that would require employers to reveal investment details of employer-operated funds, as proposed by the Administration.

It is possible that the Senate, under the guidance of the McClellan rackets commitee, will pass a comprehensive labor program. But the House is not geared for acting on anything more than the corruption issue—and in an election year, even moderate sounding legislation of this kind will be hard to get through. This is particularly true now, when Congress is preoccupied with defense matters: There isn't going to be much time for the prolonged debates sure to come in voting changes in Taft-Hartley.

Hoffa Takes Office

Union reforms ordered by federal court order

The International Brotherhood of Teamsters was granted a provisional government under a federal court order last week with James R. Hoffa as president.

Mr. Hoffa, who had been barred from taking office by an injunction pending since October, succeeded retiring Dave Beck.

The program approved by the court calls for the running of the union under the supervision of three monitors who

will keep the court periodically informed on union operations.

Mr. Hoffa's tenure has been left open. The monitors are given the discretionary power at the end of a year to recommend the calling of a special convention for election of new officers.

Dissolution of the injunction and adoption of the order by District Court Judge F. Dickinson Letts in Washington, D. C., was a compromise reached in a rank-and-file suit to unseat Mr. Hoffa by 13 dissident union members who claimed the union's October convention election of Mr. Hoffa was rigged.

Judge Letts' order paves the way for union reforms in handling of union funds, protection of the rights of union members, by-laws of local unions, appointment of convention delegates and union trusteeships. Judisdiction over the union's conduct will be retained by the court.

One of the monitors will be appointed by the Hoffa faction and one by the dissidents. Third monitor, who will act as chairman, will be named by these two. Principal task of the monitors is to decide upon and to recommend the specific reforms deemed necessary to rid the union of its corruption stigma.

The order also permits those elected with Mr. Hoffa to assume office and allows the union to give effect to the charter changes and other resolutions adopted at the October convention.

Unaffected so far by the order is the union's relationship with the AFL-CIO. The teamsters were expelled from the federation in December on the grounds of corruption. One of the conditions for reaffiliation then imposed was the removal of Mr. Hoffa from office.

Jurisdictional Dispute Forces Workers to Climb

For nine months, 500 construction workers carried their tools up 12 flights of stairs—but the Ontario government in Canada may see that it doesn't happen again.

The workers' plight stemmed from a jurisdictional dispute over operation of an elevator built for construction purposes, one union claiming the work because passengers were carried, another because cargo was carried.

The episode was cited by a construction firm in a brief presented to a provincial legislative committee studying proposed changes in labor law.

Jurisdictional disputes are one of the biggest problems the committee faces.

(*Labor continued on page 78*)

SERVICISED

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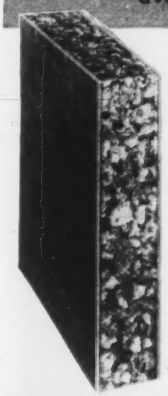
Three widely used Servicised Premolded Joint Fillers are briefly described below. Complete details, specifications and samples of any particular type or types are available on request.



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An exclusive Servicised development KORK-PAK consists of asphalt and granulated cork formed between two sheets of asphalt saturated paper.

advantages

1. It is non-extruding
2. Recovers more than 80% of original thickness after compression
3. Low moisture absorption
4. Readily handled without breakage
5. Least expensive non-extruding type

recommended uses A general purpose joint filler, particularly for highway work where the top of the joint can be thoroughly sealed with Para-Plastic.

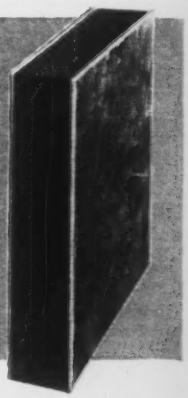
ASPHALT

A composition of asphalt, vegetable fibre and a small percentage of finely divided mineral filler, formed between two sheets of asphalt saturated paper.

advantages

1. Forms an easily compressible cushion
2. Is highly waterproof
3. Low in cost

recommended uses For interior concrete floor construction where black color is not objectionable, and most extensively in the formation of contraction joints in concrete construction where a ¼" or ⅜" thickness is often used.



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Cane Fiber Joint Filler is a non-extruding, resilient bituminous material consisting of cellular cane fibers securely bound together and uniformly saturated with a suitable bituminous binder.

advantages

1. It is non-extruding
2. Ordinary carpenter saw can be used for cutting
3. Lowest cost non-extruding type
4. Recovers more than 70% of original thickness after compression

recommended uses

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Jurisdictional Strikes Banned

NLRB says it has the power to halt strikes over work assignments whenever voluntary machinery fails

After 10 years of confusion over jurisdictional disputes, the National Labor Relations Board has announced a new approach to the role it plays in union conflicts over work assignments.

It has ruled that whenever the construction industry's voluntary settlement machinery has failed to prevent a jurisdictional strike, the NLRB will promptly accept an unfair labor practice complaint and exercise its power to halt the work stoppage without reviewing or upsetting any decision that may have been rendered by voluntary process.

The decision was handed down last week and marks another chapter in a long standing and turbulent dispute between carpenters and lathers over acoustical ceiling work (ENR Aug. 22, 1957, p. 113).

One of the most significant of recent rulings, it is a warning to all AFL-CIO building trades unions that they can no longer engage with impunity in jurisdictional strikes in violation of the agreement under which the industry's National Joint Board for the settlement of Jurisdictional Disputes operates.

It pronounces as law what some contractors have long felt—and that is that Congress' principal intent in framing the law on work assignment disputes was to eliminate jurisdictional strikes.

That belief was vigorously presented to the NLRB by the Building Trades Employers Association of Long Island, which appeared as *amicus curiae*. The association successfully argued that Congress, in attempting to promote voluntary settlements, realized that agreement on a voluntary method of settlement is not a guarantee of settlement and accordingly directed the NLRB to take and retain jurisdiction over disputes and to exercise directly its power to stop strikes whenever the voluntary process fails.

At issue was the question of whether the NLRB is ousted of jurisdiction if the parties to a dispute are subject to the Joint Board procedure.

• **Law**—Under the law, a strike by a union to compel a work assignment in its favor is an unfair labor practice. The NLRB has the power to seek injunctive relief and to stop an unfair labor practice by a cease and desist order.

To promote voluntary settlements, however, the law [Sec. 10 (k)] says that in cases of work assignment strikes the NLRB shall not conduct a hearing of its own on the unfair labor practice charge if the parties have agreed to a voluntary settlement, and shall dismiss the charge if the dispute is voluntarily settled.

In its Rules and Regulations, the NLRB earlier construed the law to mean that it is required to dismiss the charge if the parties are subject to the construction industry's Joint Board, even if the latter—as in the lather-carpenter dispute—is unable to get the parties to comply with its decision.

The Acoustical Contractors Association of New York, which also appeared before the NLRB, said failure of the board to act violates the law which "insists" on prevention of jurisdictional strikes. It urged the NLRB to exercise the full measure of its jurisdiction, holding a 10(k) hearing if the parties are not under the Joint Board, but skipping it and proceeding directly if they are.

• **New approach**—Now the labor board says its earlier construction was wrong. Actual settlement of a dispute and not merely the agreement upon a voluntary method of settlement, it holds, is the test for dismissing a charge. The regulations will be rewritten.

Because it didn't consider it fair to change the rules retroactively, a three-man majority of the board voted to dismiss a complaint against the lathers union, which had continued to protest a Joint Board decision.

It did, however, say that the lathers, as a matter of law, are bound by the Joint Board procedure as long as they remain in the AFL-CIO Building and Construction Trades Department, which, by its constitution, subjects all its affiliates to that procedure.

The decision, which accommodates the concept of the statutory scheme advanced by the Joint Board, assures contractors effective protection against jurisdictional strikes and at the same time strengthens the Joint Board procedure.

Under the new interpretation, disputing unions within the orbit of the Joint Board still must utilize its machinery for a decision on the merits of a dispute, and forum shopping is neither countenanced nor encouraged.

Still unanswered, however, is the question of whether the NLRB eventually will decide on their merits jurisdictional disputes not subject to Joint Board procedure.

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SEND COPY TO: Official Proposal Division, Engineering News-Record, P.O. Box 12, New York 36, N. Y.

Bids: February 20, 1958.

New York State Road Work

NOTICE TO CONTRACTORS: STATE DEPARTMENT OF PUBLIC WORKS, ALBANY, N. Y.—Pursuant to the provisions of the Highway Law, Canal Law, and special provisions for projects financed with Federal Aid Funds, sealed proposals will be received until ten-thirty o'clock A.M., eastern standard time on the 20th day of February 1958, by Henry A. Cohen, Director, Bureau of Contracts, 14th Floor, The Governor Alfred E. Smith State Office Building, Albany, N. Y., for the following projects:

County	Contract No.	Name	Miles	Type	Deposit	Estimated Cost of Work
DISTRICT No. 2, Lacy Ketchum, District Engineer, 109 No. Genesee Street, Utica 1, New York						
Herkimer	RC 58-6	Herkimer-Middleville, S.H. 460, BR. No. 2	....	Cleaning & Painting Br.	$400 Plans $2	$7,100
Herkimer & Oneida	M 58-1	Movable Dams 13 & 14 Burdick's Bridge E60	....	Cleaning & Painting 2 Movable Dams and Br.	$650 Plans $10	12,600
DISTRICT No. 5, G. H. Youngmann, District Engineer, State Office Bldg., 65 Court Street, Buffalo 2, New York						
Erie	PSC 17043	Bridges Carrying Seneca Street (C.R.) Over Pennsylvania R.R. & New York Central R.R.	0.22	Asphalt Concrete, 0.22 Mile, Including Reconstruction of 2 Brs., I Beam Br. Over Pennsylvania R.R., 3 Spans Total 86', I Beam Br. Over New York Central R.R., 3 Spans Total 88'	$6,000 Plans $2	115,000
Niagara	M 58-2	Pendleton Guard Gate No. 18	....	Cleaning & Painting Guard Gate	$500 Plans $10	9,400
DISTRICT No. 8, K. G. Rauer, District Engineer, Pleasant Valley Road, Poughkeepsie, New York						
Orange	FASS 58-2	Warwick-Smith Corners Road, Part 2, County Road No. 1, Project S-484(I)	.31	Asph. Conc. = 0.27 Mile; Misc. Work = 0.04 Mile: Prestressed Conc. Beam Br., 3 Spans Total 170.3 Feet	$24,000 Plans $2	428,000
Westchester	FISWC 58-1	New York State Thruway—Southern West. Connection—Sub. 11 (New York City Line-Tuckahoe Road) Project I-1100(4), Interstate Route 502	0.16	Grading, Drainage & Misc. Work 0.16 Mile, including Ped. Overpass—Weld. Girder 5 Spans Total—315.8 Feet; Ped. Overpass—Weld. Girder 2 Spans Total—199.5 Feet	$10,000 Plans $3	177,000
DISTRICT No. 9, J. C. Frederick, District Engineer, 71 Frederick Street, Binghamton, New York						
Sullivan	FESS 58-1	Barryville-Eldred, C.R. 11 Project ER-22(2)	0.82	Asph. Conc. 0.82 Mile Including Prestressed Concrete Beam Bridge Span 52.3'	$18,000 Plans $2	319,000
DISTRICT No. 10, M. E. Goul, District Engineer, 325 W. Main Street, Babylon, L. I., New York						
Bronx	FICBE 58-1	Cross Bronx Expressway—Contract 1F (University Ave. to Anthony Ave.), Interstate Route Connection No. 511. Project I-1084(31)	0.98	Demolition	$43,000 Plans $2	789,000
Suffolk	OPRC 58-1	Ocean Parkway NRH-OP 33-1	7.14	8" Cem. Conc. Pavt., 25' Wide	$15,000 Plans $3	2,501,000

Any projects in this letting that are on the Federal Aid highway systems are subject to the provisions of the "Federal-Aid Highway Act of 1956", being Public Law 627, 84th Congress, approved June 29, 1956, and are also subject to the applicable New York State statutes.

In compliance with the provisions of Section 115 (Prevailing Rate of Wage) Public Law 627, the minimum wages to be paid laborers and mechanics are included in wage schedules that are set out in the bid proposal.

Maps, plans, specifications and proposal forms may be seen and obtained at the office of the State Department of Public Works, Bureau of Contracts, Albany, N. Y., and at the office of the District Engineers noted above, and may also be seen at the office of the State Department of Public Works, 270 Broadway, New York City.

The deposit for Plans and Proposal Forms for each contract is indicated above. A refund will be made in full to bidders for return of one set, in good condition, within 30 days of award, or rejection of bids; refund for all other sets in good condition, similar period, will be 50% of deposit.

Special attention of bidders is called to "General Information for Bidders" in the proposal, specification, and contract agreement, and to the special provisions applying to projects financed with federal funds. Award of a contract is subject to priorities and allocations under the Defense Production Act of 1950, as amended, and all regulations issued thereunder.

Proposal for each contract must be submitted in a separate sealed envelope with the name and number of the contract plainly endorsed on the outside of the envelope. Each proposal must be accompanied by draft or certified check payable to the order of the "State of New York, Commissioner of Taxation and Finance" for the sum as specified in the advertisement and the proposal. The retention and disposal of the bidding check, the execution of the contract and bonds shall conform to the provisions of the Highway Laws, as set forth in "Instructions to Bidders".

The right is reserved to reject any or all bids.

JOHN W. JOHNSON
SUPT. OF PUBLIC WORKS

Read the Official Proposal Columns of

ENGINEERING NEWS-RECORD

This Week and Every Week

OFFICIAL PROPOSALS

Bids: June 1st, 1958

Baghdad Drainage Contracts IA, IB and IC

CITY OF BAGHDAD
BAGHDAD SEWERAGE BOARD
TO CIVIL ENGINEERING CONTRACTORS

THE BAGHDAD SEWERAGE BOARD invites Tenders for the construction of the Civil Engineering Works of the First Stage of the Baghdad Sewerage Scheme.

The Works to be constructed comprise three Contracts and Contractors may submit Tenders for any one, any two or all three of the individual Contracts. The Conditions of Contract, Specification, Bills of Quantities, Form of Tender, etc., for all three Contracts are contained in the same Tender Document.

The Works to be constructed in the individual Contracts are:—

CONTRACT IA: The first stage of the Soiada Sewage Treatment Works for a population of 300,000 persons and including pumping stations, settlement tanks, channels, outfall, sludge digestion tanks, power house and ancillary works.

CONTRACT IB: Approximately 11 Km. of Trunk Sewer between 1, 85 m. and 2.3 m. diameter, 14 sewage pumping stations, and short lengths of 0.6 m. and 0.75 m. diameter sewers and associated pumping mains.

CONTRACT IC: Approximately 170 Km. of pipe sewers between 22.5 cm. and 45 cm. diameter, together with associated pumping mains, laterals for house connections and ancillary works. (Note. In certain circumstances Tenders for shorter lengths of sewers and associated works will be considered)

The Tender Document and Contract Drawings may be inspected during normal working hours after January 6, 1958, at the offices of the Baghdad Sewerage Board, Baghdad, at the Royal Iraqi Embassies in Bonn and Washington, at the Royal Iraqi Legations in Brussels and Rome, and at the offices of the Consulting Engineers, John Taylor and Sons, Artillery House, Artillery Row, London, S.W. 1 and 464 Alwiyah, Baghdad (Telephone No. Baghdad 98736).

Copies of the Tender Document and Contract Drawings may be obtained from any of the above-mentioned addresses on payment of I.D. 20,000 ($56.00). This payment will not be returnable and must be made by check or Bank's draft payable to the Consulting Engineers.

The Tenders shall be in English and must be accompanied by a deposit of I.D. 10,000 ($28.00) either in cash or by a letter of guarantee from an approved Bank in Iraq. The Tenders and accompanying documents must be enclosed in a sealed package which shall not in any way indicate the name of the Tenderer and must be delivered in Baghdad in accordance with the Instructions contained in the Document by 12 o'clock noon local time on the 1st day of June, 1958.

During the time allowed for tendering the Baghdad Sewerage Board reserves the right to amend the documents for the purposes of clarification or modifications in design or contract conditions. Any such amendments will be notified in writing to prospective tenderers.

The Baghdad Sewerage Board does not bind itself to accept the lowest or any tender.

(Signed) FAKHRI AL FAKHRI
Chairman of the Baghdad
Sewerage Board

Bids: February 25th, 1958.

Contracts TN-10C and TN-10D

TRIBOROUGH BRIDGE AND TUNNEL AUTHORITY

SEALED BIDS WILL BE RECEIVED BY Triborough Bridge and Tunnel Authority at its office, Administration Building, Randall's Island, Manhattan, New York 35, N. Y., as follows:

Until 11 A.M. on Tuesday, February 25, 1958

For Throgs Neck Bridge Contract No. TN-10C, Steel Superstructure—Bronx Approach, Borough of The Bronx in The City of New York. The bid must be accompanied by a deposit in the amount of $250,000.00.

and

For Throgs Neck Bridge Contract No. TN-10D, Steel Superstructure—Queens Approach, Borough of Queens in The City of New York. The bid must be accompanied by a deposit in the amount of $250,000.00.

Bidders may submit bid for either one or both of the above contracts.

Plans, specifications and contract documents may be purchased at the office of the Authority for $30.00, which will not be refunded.

OFFICIAL PROPOSALS

Bids: Feb. 6, 1958.

Soil Explorations and Foundation Investigations at Various Sites

NOTICE TO CONTRACTORS

STATE DEPARTMENT OF PUBLIC WORKS, ALBANY, N. Y.—Pursuant to the provisions of Highway Law, sealed proposals will be received until 10:30 a.m. Eastern Standard Time, on February 6, 1958, by Henry A. Cohen, Director, Bureau of Contracts, 14th Floor, The Governor Alfred E. Smith State Office Building, Albany, N. Y. for:

SOIL EXPLORATIONS AND FOUNDATION INVESTIGATIONS AT VARIOUS SITES ON: INTERSTATE ROUTE 513, CLEARVIEW EXPRESSWAY, HILLSIDE AVENUE TO THROGS NECK BRIDGE, HORACE HARDING INTERCHANGE AREA, PROJECT 1-1112(1), QUEENS COUNTY, WHICH CONSTITUTES CONTRACT NO. SPEC. FA-SM-118.

Maps, plans and specifications may be examined and obtained at the following offices:

(a) Bureau of Contracts, 14th Floor, The Governor Alfred E. Smith State Office Building, Albany 1, New York.
(b) Mr. M. E. Goul, District Engineer, New York State Department of Public Works, 325 West Main Street, Babylon, Long Island.
(c) Mr. William M. Trainer, Associate Contract Engineer, Department of Public Works, 270 Broadway, New York City.

The deposit for a set of plans, specifications and proposal forms is $5.00. A refund in full will be made to bidders for return of one set in good condition within 30 days of award or rejection of bids; refund for all other sets in good condition, similar period, will be 50 percent of deposit.

The Engineer's Estimate of cost for this work is $20,000.00.

Proposal for this contract must be submitted in separate sealed envelope with the name of the contract plainly endorsed on the outside of the envelope. Proposal must be accompanied by draft or certified check, payable to the order of the "State of New York, Commissioner of Taxation and Finance" for the sum of $1,000.00. The retention and disposal of the bidding check, the execution of the contract and bonds shall conform to the provisions of the Highway Law, as set forth in "Instruction to Bidders".

The right is reserved to reject any or all bids.

JOHN W. JOHNSON
SUPERINTENDENT OF PUBLIC WORKS

Bids: March 10, 1958

Youth Center Building

Sealed proposals for Building, Mechanical, and Electrical Work for the Youth Center Building, Dearborn Civic Center, Dearborn, Michigan, will be received by the City of Dearborn, Michigan, at the office of the City Clerk in the Municipal Building, Michigan Avenue and Schaefer Road, until 2:00 P.M. March 10, 1958 and will immediately thereafter be publicly opened and read aloud.

One award will be made for building, mechanical, and electrical work.

The contract documents are on file and may be examined at the office of the Architects and Engineers during business hours. Copies of the documents may be obtained by depositing at the Architects and Engineer's office cash or check in the amount of $30.00, which amount will be refunded if the complete documents are returned in good condition within 10 days after the opening of bids.

Proposals must be submitted in the form provided therefor by the Architects and Engineers. A certified check or a cashier's check payable to the City of Dearborn, Michigan, in an amount not less than 5 percent of the base bid, shall be submitted with each proposal, subject to the conditions set forth in the Instructions to Bidders.

The accepted bidder will be required to execute performance and llen bonds, each for the full amount of the contract.

No proposal may be withdrawn for at least 60 days after the scheduled closing time for receipt of proposals.

The City of Dearborn reserves the right to waive any informality in any bid, or to reject any or all bids, in whole or in part, should it be deemed for its best interests so to do.

CITY OF DEARBORN, MICHIGAN
JOSEPH CARDINAL
City Clerk

Harley, Ellington & Day,
Architects and Engineers
153 E. Elizabeth St.
Detroit 1, Michigan

OFFICIAL PROPOSALS

Bids: Feb. 25, 1958.

Contract BP-150.007

THE PORT OF NEW YORK AUTHORITY
BROOKLYN-PORT AUTHORITY PIERS
PIER 1
PIER SHED

Sealed proposals for the construction of the pier shed exclusive of the structural steel therefor for new Pier 1 at the Brooklyn-Port Authority Piers will be received at the office of the Chief Engineer of The Port of New York Authority, Room 1100, 1111 Eighth Avenue, New York 11, N. Y., until 2:30 P.M. on Tuesday, February 25, 1958, at which time said proposals will be opened and read in Room 1108.

Contract documents may be seen at the office of the Engineer of Design of the Authority, Room 1115. Documents will be furnished upon deposit of $50.00 per set for not more than three sets to any one company (each set including one copy of the contract drawings). Additional sets will be furnished upon payment of $50.00 per set, which payment is not returnable. Deposits and payments shall be delivered to the Treasury Department, Room 1001, where a receipt will be issued. The receipt shall be delivered to Room 1115, where the documents will be furnished.

Those who have submitted a bid on the contract will receive a refund of the deposit for each set of documents, not exceeding three, returned within forty days after the opening of proposals. Those who have not submitted a bid will receive a refund of one-half of the deposit for each set of documents, not exceeding three, returned within forty days after the opening of proposals.

THE PORT OF NEW YORK AUTHORITY
Donald V. Lowe, Chairman

New York, January 30, 1958.

Bids: February 18, 1958

Contract NYA-920.005

THE PORT OF NEW YORK AUTHORITY
NEW YORK INTERNATIONAL AIRPORT
RUNWAY V
UPLANDS TAXIWAYS SURCHARGE

Sealed proposals for the placement of surcharge for the taxiways to be constructed adjacent to proposed Runway V at New York International Airport will be received at the office of the Chief Engineer of The Port of New York Authority, Room 1100, 111 Eighth Avenue, New York 11, New York, until 2:30 P.M. on Tuesday, February 18, 1958, at which time said proposals will be opened and read in Room 1108.

Contract documents may be seen at the office of the Engineer of Design of the Authority, Room 1115. Documents will be furnished upon deposit of $30.00 per set for not more than three sets to any one company (each set including one copy of the contract drawings). Additional sets will be furnished upon payment of $30.00 per set, which payment is not returnable. Deposits and payments shall be delivered to the Treasury Department, Room 1001, where a receipt will be issued. The receipt shall be delivered to Room 1115, where the documents will be furnished.

Those who have submitted a bid on the contract will receive a refund of the deposit for each set of documents, not exceeding three, returned within forty days after the opening of proposals. Those who have not submitted a bid will receive a refund of one-half of the deposit for each set of documents, not exceeding three, returned within forty days after the opening of proposals.

THE PORT OF NEW YOOK AUTHORITY
Donald V. Lowe, Chairman

New York, January 30, 1958

U. S. Government

DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Invitation No. DS-5012) will be received at Denver, Colorado, until March 6, 1958, for furnishing 222,000 tons of pozzolan, in bulk for Glen Canyon Dam and Powerplant, Colorado River Storage Project, Arizona. Delivery is desired from August 1, 1959 through December 31, 1963. For particulars, address Bureau of Reclamation, Building 53, Denver Federal Center, Denver 2, Colorado. W. A. Dexheimer, Commissioner.

READ THE OFFICIAL PROPOSAL COLUMN OF
ENGINEERING NEWS-RECORD
THIS WEEK AND EVERY WEEK

OFFICIAL PROPOSALS

Many contractors depend entirely upon the

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for Opportunities to bid. They might not see your announcements if printed elsewhere.

You undoubtedly want their bids on your contracts. Make sure of them on your next contract.

The cost is only $2.40 a line per issue.

OFFICIAL PROPOSALS

Bids: Feb. 28, 1958

Stormwater Sewer East Capitol St

GOVERNMENT OF DISTRICT OF COLUMBIA, DEPT. OF SANITARY ENGINEERING, D. C., January 17, 1958. SEALED PROPOSALS will be received in Room 404, 499 Pennsylvania Avenue, N. W., Washington 1, D.C., until 2 PM. EST, February 28, 1958, and then publicly opened and read for construction of 12'—0" Diameter Stormwater Sewer, East Capitol Street, between Burns Street and Texas Avenue, consisting of approximately 3-177 lin. ft. 12'—0" diameter brick and reinforced concrete masonry in tunnel. Proposal forms, plans and specns. obtainable from Supervisor, Bid & Contract Section, Procurement Office, D. C., Room 404, 499 Pennsylvania Avenue, N. W., upon deposit of a certified check for $50.00 per set, payable to Collector of Taxes, D. C. (Tel. NA 8-6000, Ext. 2378).

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OFFICIAL PROPOSALS

Bids: Feb. 11, 1958.

Contract HP-130.002

THE PORT OF NEW YORK AUTHORITY
HOBOKEN-PORT AUTHORITY PIERS
DEMOLITION OF BUILDING NO. 5 AND PAVING

Sealed proposals for the demolition of Building No. 5 and constructing asphalt concrete pavement at the Hoboken-Port Authority Piers will be received at the office of the Chief Engineer of The Port of New York Authority, Room 1100, 111 Eighth Avenue, New York 11, New York, until 2:30 P.M. on Tuesday, February 11, 1958, at which time said proposals will be opened and read in Room 1108.

Contract documents may be seen at the office of the Engineer of Design of the Authority, Room 1115. Documents will be furnished upon deposit of $30.00 per set for not more than three sets to any one company (each set including one copy of the contract drawings). Additional sets will be furnished upon payment of $30.00 per set, which payment is not returnable. Deposits and payments shall be delivered to the Treasury Department, Room 1001, where a receipt will be issued. The receipt shall be delivered to Room 1115, where the documents will be furnished.

Those who have submitted a bid on the contract will receive a refund of the deposit for each set of documents, not exceeding three, returned within forty days after the opening of proposals. Those who have not submitted a bid will receive a refund of one-half of the deposit for each set of documents, not exceeding three, returned within forty days after the opening of proposals.

THE PORT OF NEW YORK AUTHORITY
Donald V. Lowe, Chairman

New York, January 30, 1958

Bids: Feb. 10, 1958.

Contract No. 109

NOTICE TO BIDDERS

Sealed proposals will be received at the office of the Albany Port District Commission, Port of Albany, Albany, N. Y. on Monday, February 10, 1958, until 10 o'clock A.M. Eastern Standard Time, at which time and place they will be publicly opened and read for the work embraced in the following contract;

CONTRACT NO. 109—Repairs to Timber Dock at Lumber Terminal, Rensselaer, N. Y.

Information for bidders, specifications and itemized proposals may be obtained at the Office of the Albany Port District Commission, Port of Albany, Albany, New York.

The Albany Port District Commission reserves the right to reject any or all proposals, if in its judgment its interest will be enhanced thereby.

MICHAEL J. POWERS
CHAIRMAN

FRANK W. DUNHAM JR.,
GENERAL MANAGER

Bids: April 14, 1958

Contract No. 18
Power Transformers and Accessories

GOVERNMENT OF IRAQ
ELECTRIFICATION OF CENTRAL EUPHRATES ZONE

The Development Board and Ministry of Development of the Government of Iraq invites tenders from qualified firms for the supply, delivery, erection and supervision of operation of 28 Power Transformers and Accessories ranging from 50 kVA to 25 MVA, for the Baghdad-South Power Station and seven substations in the Central Euphrates Zone.

Full information regarding this tender can be obtained on and after Jan. 20, 1958 from Embassy of Iraq, Washington or Messrs. Electrobel—Traction et Electricite, 1, Place du Trone, Brussels, Belgium.

All Tender Documents are to be submitted in English to the Ministry of Development, on or before 12 noon, local time, on April 14, 1958.

Minister of Development.

EMPLOYMENT OPPORTUNITIES

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The advertising rate is $39.20 per inch for all advertising appearing on other than a contract basis. Frequency rates quoted on request.

An advertising inch is measured 7/8" vertically on a column—3 columns—30 inches to a page.

Subject to Agency Commission.

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$2.40 per line, minimum 3 lines. To figure advance payment count 5 average words as a line.

Position Wanted ads take ½ of above rate.

Box Numbers—count as 1 line.

Discount of 10% if full payment is made in advance for 4 consecutive insertions.

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Send NEW Ads and Inquiries to Classified Advertising Division of ENGINEERING NEWS-RECORD
P. O. Box 12, N. Y. 36. February 13th issue closes February 3rd

REPLIES (Box No.): Address to office nearest you
c/o This publication Classified Adv. Div.
NEW YORK: P. O. Box 12 (36)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

POSITIONS VACANT

Superintendent thoroughly qualified, large sewer & watermain installations. Permanent, N. Y. State. P-6844, Engineering News-Record.

Construction superintendent, thoroughly qualified in estimating and field supervision. Must have experience and references. Steady employment. Iowa and Illinois location. State education and expected salary. P-6964, Engineering News-Record.

Assist. Prof.—To teach undergrad. courses in surveying and highway engineering. Salary depends on qualifications. Dept. of Civil Eng., Univ. of N. Dakota, Grand Forks, N. Dak.

Wanted—Experienced Engineers to prepare plans for Water Filtration Plants and/or sewage Treatment Plants. State experience, salary requirements and when could report. P-7015, Engineering News-Record.

Structural Steel Detail Draftsman. One or two years experience—structural or miscellaneous steel. Good starting rate, vacation, hospitalization-accident-life insurance plan. Send brief resume to: Chief Engineer, Michigan Fabricating and Welding, Inc., P. O. Box 567, Jackson, Michigan.

Detailer & Checker Structural Steel. Must be experienced. Hospitalization and retirement benefits. Give references, age, and salary expected in application. Barber & Ross Company, 2323-4th Street, N.E., Washington, D. C.

Asphalt Plant Supt: Must know Plant set-up, material control and lay down operation. Permanent, Kansas. P-7076, Engineering News-Record.

Sewer Supt: Must know machinery, all types excavation, able to travel, permanent. Kansas-Nebraska. P-7077, Engineering News-Record.

Gravel Production Supt: Able to locate pits, set-up plant and produce to State specifications. Permanent, Kansas. P-7078, Engineering News-Record.

Engineer-Estimator: Northwestern Ohio and Southern Michigan. Bridges, concrete, piling, excavating, sewers. Ability to supervise work desirable, but not essential. Salary plus job bonus. Small organization, but opportunity as large as you make it. P-7079, Engineering News-Record.

Sales Manager and sales force wanted for large prestressed concrete manufacturing firm in Florida. Engineering background desired. Contact P-7073, Engineering News-Record giving full background information and desired salary, etc.

The State of New Jersey has immediate vacancies for qualified civil engineers with experience in hydraulic engineering. Positions covered by Civil Service; offer excellent promotional opportunities; attractive retirement plan. Starting salaries range from $6600 to $7200 per annum depending upon qualifications. Write Dept. of Conservation & Economic Development Div. Water Policy & Supply, 520 East State St., Trenton 25, N. J.

Civil Engineer for design and construction of Municipal street and sewer projects. Starting salary will be between $426.00 and $561.00 depending on qualifications. Apply to the Civil Service Commission, City Hall, Springfield, Illinois.

POSITIONS VACANT

Wanted—Licensed Civil Engineer for County Engineer. State age and experience. Greenfield, Adair County, Iowa.

Estimator—Public, Industrial and Commercial building construction. Top salary for top man. Location Northern Ohio. P-7104, Engineering News-Record.

Hydraulic Engineers—Civil Engineer Graduates—All grades, interested or experienced in Stream Flow Measurements, analysis of Hydrologic data, Hydraulic design criteria for dams, channels and bridges for regulatory agency. Duties include review of plans and specifications, report writing, operation of stream-gaging network, interpretation of stream flow data, field investigations and inspections, with some travel and public relations. Salary depending on experience. Location Harrisburg, Pennsylvania. P-6828, Engineering News-Record.

Service Managers job available for leading equipment distributor located in the East. Applicant must have managerial as well as actual construction experience in earth moving machines, diesel engines, and power shovels. Please address reply to P-7142, Engineering News-Record.

Chemist to take charge of laboratory for sewage & water analyses. Must have background of sanitary laboratory experience including bacteriology. Salary dependent on qualifications with maximum at $6,000. Furnish details of education, experience, age, references & availability to Supt. of Waste Treatment Plant, City Hall, Waterbury, Conn.

Civil, mechanical, electrical, and drawing faculty for growing engineering degree programs. College in pleasant small city at foot of Sierra Nevada recreation region within three hours drive of San Francisco Bay area. Write President Glenn Kendall, Chico State College, Chico, California.

Experienced Sewer, Grading and Paving Foremen—Steady Employment to qualified Men—Northeastern Ohio. Please reply, giving qualifications and experience, to P-7121, Engineering News-Record.

Civil, Electrical, and Mechanical Engineers: One opening in each field for fall of 1958. Graduate degrees or equivalent preferred; teaching experience desirable. Salaries open, depending on qualifications. Medical, Hospital, and Pension plans. For further information write the Chairman of the Staff Committee, Essex College, Assumption University of Windsor, Windsor, Ontario, Canada.

Sanitary Engineer—Experienced in design and specification writing for sewage treatment plants. Furnish brief resume of qualifications to Gardner & Sterling, Consulting Engineers, Calvert & Bond Streets, Salisbury, Maryland.

SELLING OPPORTUNITY OFFERED

Sales engineer, for midwest territory, to represent established manufacturer of wellpoint dewatering equipment. Preference will be given man with knowledge of soils and pumping equipment. State education, age, experience, salary. SW-7140, Engineering News-Record.

POSITIONS WANTED

Acct. Office Mgr. Fully experd. all field and office detail for Industrial, Highway etc. const. Available at once. PW-7000, Engineering News-Record.

Construction Supt. General Construction. PW-6827, Engineering News-Record.

POSITIONS WANTED

Construction Engineer B.C.E. 9 years experience in building construction, field and office engineering, field supervision, expediting, estimating and project engineer. Reply PW-6934, Engineering News-Record.

Construction Manager, available soon for responsible connection Western U. S. Experienced, 25 yrs. Supervising, Manageing, Estimating, bidding of Industrial, Commercial, Municipal and Federal building and heavy Construction for General Contractors. PW-6992, Engineering News-Record.

Project Manager or Superintendent for architect or contractor available February. Now completing luxury type 325 room El San Juan Hotel. Working knowledge Spanish and French. Also experienced heavy construction and housing. Age 44, single. Airmail replies to: Allen McSherry, P.O. Box 6034, Loiza Station, Santurce, Puerto Rico.

Superintendent or Estimator thoroughly experienced and qualified to handle all phases of job from bid to completion: Sewage and Water Treatment Plants, Power Plants, Building Const., Bridges, Foundations, Cofferdams, Piling, Reinforced Concrete. PW-7010, Engineering News-Record.

Construction Superintendent now employed desires change. Industrial, commercial, chemical plants. Atlantic States preferred. PW-7020, Engineering News-Record.

Field Engineer—Asst. Supt.—Age 27, 9 yrs. exp.—Hwys., bridges, bldgs. Good N.Y.C. labor connections in bldg. const. want steady position—good references—available Feb. 1st. PW-7023, Engineering News-Record.

Construction Superintendent now employed desires job with general contractor on estimating, sub-contractors, shop drawings, scheduling, costs, etc. PW-7034, Engineering News-Record.

Canadian Consulting Engineer, civil, seeks short term foreign jobs. Salary or fee basis. PW-7025, Engineering News-Record.

Construction Engineer, 31, C.E., P.E., experienced light, heavy, & highway construction. Desires permanent position with bridge & highway contractor. Do estimating construction design, planning, scheduling, & purchasing. Available immediately. PW-7048, Engineering News-Record.

Dredging Engineer. All phases for port, harbor, channel and river work. Layout, design, supervision, operation, hydro and land surveys, inspection. Individual services or with supporting personnel. Will contract for work anywhere in world. John Huston, Corpus Christi, Texas. TUlip 3-1201, TErminal 5-0742.

Civil Engineer, Registered—9 years experience in Industrial and Heavy Construction. Desire challenging position with Contractor or firm engaged in design and construction. PW-7065, Engineering News-Record.

Civil Engineer—graduate, registered, 7 years construction and design of highways, concrete and steel structures. 1 year instructor and grad work in soils. Speak Spanish. Qualified Field, or Designing Engineer, Domestic or Foreign. Collier, 4 Barnes Rd., Tarrytown, N. Y.

Engineer 35, Married seeks responsible position 11 years Civil, Sanitary engineering and Construction experience in South America and U.S.A. Intimate knowledge S.A. Laws and Regulations, Influential Contacts, Fluent Spanish and English. PW-7126, Engineering News-Record.

(Continued on opposite page)

AVAILABLE

ELECTRICAL ENGINEER

35, Graduate, Reg PE, 12 years wide experience. Seeks position with Contractor, Resume on Request.

PW-7087, Engineering News-Record,
Class. Adv. Div., P. O. Box 12, N. Y. 36, N. Y.

POSITIONS WANTED

(Continued from opposite page)

Contractor's Assistant, competent estimator-job manager, graduate engineer, 32, seeks position of responsibility with medium or Middle Atlantic States. PW-7105, Engineering News-Record.

Superintendent: 48, broad experience in all phases of buildings, irrigation projects, railroads and general construction. Knowledge of Spanish. Prefer foreign work. PW-7109, Engineering News-Record.

Electrical Engineer. Thirty-five years experience all phases of electrical and mechanical construction and operation. Married, no children, free to travel. Excellent health. Layout and design. Prefer field and construction. PW-7127, Engineering News-Record.

Civil Engineer, 33, BSCE, 9 years experience general construction. Field layout, superintendent, expediting, co-ordinating, estimating, project engineer. Prefer Detroit area but will relocate. PW-7129, Engineering News-Record.

C.E.-Pilot. B.S., M.S., Eng'r. Age 41. Exp. structural design, prop. surveys, teaching C.E. Registered. Present position 5 years. Desire change where broad experience and sound training will be of value to both of us. PW-7123, Engineering News-Record.

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P-6709, Engineering News-Record
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P-7141, Engineering News-Record
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SW-7093—Engineering News-Record
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FS-6865, Engineering News-Record
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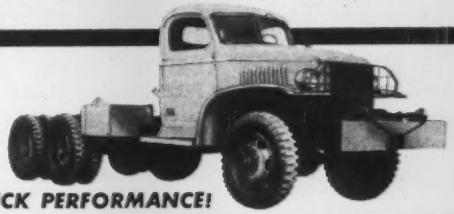

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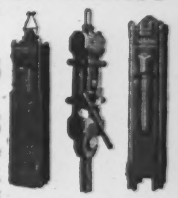

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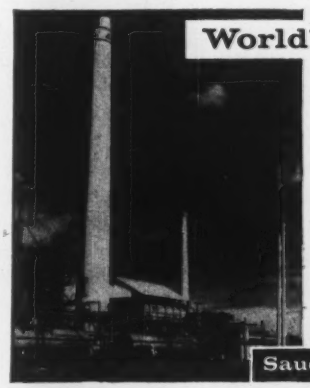

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Peace and Construction

NEXT TO MISSILE PRODUCTION, construction was the activity which received major attention in the President's first two messages to Congress. The reason for this is plain. Upon facilities that construction must provide, depends both our ability to make missiles and to launch them. And upon construction is also based our bid to keep our economy strong, our allies bound to us and our way of life more appealing than Soviet imperialism to the uncommitted peoples of the world.

Whether Congress will sense the needs as clearly as the President does, and act upon them with the kind of statesmanship that the President mapped for the lawmakers, remains to be seen.

There seems little question but that Congress will vote all of the military funds asked. Our precarious defense position and a public temper, which demands action, cannot be denied. And, in so far as civil public works are concerned—to keep the economy strong and growing—there is the distinct possibility that Congress, sensing votes, will do more than is asked, or even needed.

It is in a third category, where construction plays a prominent part, that Congress is apt to short change the defense effort dangerously. This is the field of foreign economic aid where recipients can exert no vote-getting pressure, and where the decision must be made solely on the basis of logic, reason and statesmanship. Congress failed in its duty in this field last year. It will have to rise to its full stature not to fail again.

Why is foreign economic aid so important? Basically it is because the U.S. cannot defend itself without allies and cannot grow and prosper in a pauperized, unfriendly world. Realistically, it is because the Soviet Union has chosen to challenge us in this field of winning the friendship and support of countries whose manpower and resources are vital to a free world's existence.

In his State of the Union Message the President made no more important statement than, "The only answer to a regime that wages total cold war is to wage total peace." A strong military establishment, supplemented by military aid to allies, can avert a shooting war, but the resulting state will not be peace. Military strength can "serve the cause of peace by holding up a shield behind which the patient constructive work of peace can go on," the President said. Foreign economic aid, ample in amount and wisely administered, permits one of the best constructive works that we have the power to perform.

Of the $4 billion the President has asked for foreign aid, only about one-fourth is for non-military assistance. If anything, this is too little, rather than too much. But in any event it is not a "giveaway," but a vital weapon for waging peace. It may not produce votes, but it will promote security, and Congress will be subjecting the country to real danger if it does not recognize this.

Any Congressman who is tempted to revive the false bogey of "giveaway" should give thought to the President's warning, "We cannot afford to have one of our most essential security programs shot down with a slogan." We should wage peace with foreign aid. For surely, the Russians will.

Swedes Show the Way

THE REMARKABLE SWEDISH TUNNELERS have set a new world's record for tunneling in hard rock, this time at the huge Stornorrfors project (see p. 38). Miners removed 38,100 cu ft of rock per day per heading—averaged over four headings totaling 2.5 miles in length. During top production periods, daily removals exceeded 40,000 cu ft.

The Stornorrfors mark far surpasses the previous record, also held by the Swedes, set in the 1,410 sq ft top heading on the Harresele project (ENR Sept. 1, 1955, p. 34). Here, 31,725 cu ft per day was removed over the best weekly period.

At Stornorrfors, too, the tunneling record was not the whole story. The novel benching rigs used should be of timely interest in the U.S., in view of the big rock excavation job coming up at Niagara Falls. Also deserving of careful appraisal by hard-rock men over the world are the methods employed in raise driving, rock bolting and surface blasting.

All in all, Mr. Goransson, who set up and directed the early work, is certainly correct in qualifying the 2.2 million cu yd Stornorrfors underground plant as a bench mark in world rock excavation history.

Too Sad Commentary

REVIEWING CIVIL ENGINEERING ACCOMPLISHMENT of 1957, THE ENGINEER of London starts off strong with the statement: "That the civil engineer's work is a fundamental need of life is beyond a doubt." But the magazine then makes the surprising comment, "That his work should be discussed and understood by those in walks of life completely removed from it, seems to be asking too much. There is no news value in civil engineering—unless, of course, something goes wrong . . . then everyone is told."

Now this is a much too pessimistic conclusion. We refuse to admit that there is no news value in civil engineering projects. In the U.S., structures frequently make news—without falling down. We'll bet they can in Britain, too. Moreover, the work of the civil engineer can be understood and appreciated by the man in the street whenever the profession works hard enough at its public relations—both in the U.S. and in Britain.

1.

A healthy turnpike contract caught the eye of builder Sid;
He fine-tooth-combed the specs and promptly added up his bid.
Alas, his efforts laid an egg—his bid bond came too late.
No bond, no bid, no job for Sid: he missed the closing date.

2.

Sid hit the ceiling—raised the roof—grew crimson, furious.
He buttonholed the man who won and moaned, "I'm curious.
How come slow service on my bond derailed my well-laid plan?"
"My secret's simple," said the winner. "Call a Travelers man

3.

"The Travelers sends an *expert*—not some ordinary Joe.
He sells *the* bond for every job and doesn't waste your dough
On fancy frills and furbelows that you will never need.
But even more important—Travelers bonds arrive with *speed.*"

4.

"I'm sold already," Sid replied. "There's reason in your rhyme
Just watch me go now that I know my bonds will be on time."
You needn't let a snail-like bond knock all your plans askew.
A Travelers bond's not only right, but it's the quickest, too.

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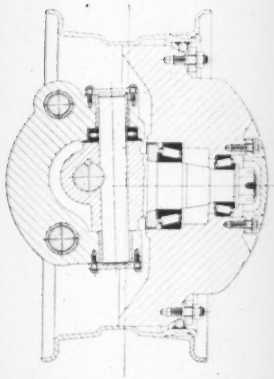

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Timken bearings are geometrically designed to provide true rolling motion—precision manufactured to live up to their design. They practically eliminate friction. And by holding shafts concentric with their housings, they make closures more effective—keep lubricant in, dirt out.

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